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Plant Industry Division

Annual Report
1987-88

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Plant Industry Division

Annual Report

1987 - 88

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Table of Contents

HIGHLIGHTS 1

BRANCH ACTIVITIES

Crop Protection Branch..5
Soils Branch..32
Field Crops Branch..50
Alberta Tree Nursery and Horticulture Centre..........................63
Alberta Special Crops and Horticultural Research Center................66

REGIONAL CROP PRODUCTION SPECIALISTS REPORTS.................73
INVENTORY OF PID RESEARCH PROJECTS.............................95
PUBLICATIONS..111

Highlights

HIGHLIGHTS

- An intensive crop management program combining production and economic factors of crop production was launched. A Steering Committee was established responsible for identifying programs/projects which fit "Maximising Economic Yield" criteria. A review of Intensive Crop Management as applicable to Alberta was released to industry and government interests.

- Special crops acreage increased significantly with field peas being the largest acreage. The crop diversification mandate of the department was inititiated and a major conference held in late 1987.

- A Special Crops Steering Committee and Action Group were selected to develop and carryout a departmental mandate to further diversify the crop base in Alberta, attract infrastructure, and provide/guide needed research. The mandate is also to provide overall guidance and commitment for the long term development of the special crops industry.

- Winter triticale development continued with new selections looking very promising. From both a feed and food ingredient point of view winter triticale has some advantages, proving itself a superior silage material and for certain food industry applications winter triticale looks very promising.

- Work was initiated on control measures for the Russian Wheat Aphid which rapidly moved toward Alberta during 1987. Chemical and biological control methods and monitoring systems were investigated.

- Crop production and management on organic soils poses many problems not typical to other soil types. Trials involving mixing mineral and organic soils materials and determining crop/soil interrelationships were initiated.

- A combination of deep ripping and application of waste gypsum under solonetzic soil conditions has shown encouraging results in several trial locations which will be followed-up in detail.

- A methods manual for nutrient analysis was developed jointly with other prairie provinces to serve as a manual for private and public sector labs.

- Tripartite programs for sugar beets and dry edible beans were developed and initiated for honey.

- The Plant Industry Division was presented an environmental award by the Industrial Vegetation Management Association recognizing work done on the de-activation of soil sterilants.

- New laboratory facilities were approved and begun at the Alberta Special Crops and Horticultural Research Center at Brooks including new growth chamber and tissue culture facilities, post-harvest, potato storage and quality evaluation labs.

- Investigation into copper deficiency in Alberta soils was intensified as more frequent and larger areas of crops effected by melanosis were observed.

- Staff developed approaches to assure Hessian Fly free status of alfalfa hay in order to access the growing market in Japan.

- A survey of the Alberta Horticulture Industry was released identifying the economic impact of the industry.

- Honey production increased to 11.6 million kg (despite lower prices) from 207,600 colonies. The industry faced a major crisis when importation of bees was prohibited by federal order. A beekeeper assistance program of $10.00 per hive was initiated for 1988; expenditures over two fiscal year will be reported in the following annual report.

- Alberta was kept free of Norway rat, diffuse and spotted knapweed, Dutch Elm disease, nodding thistle, Varroa and other pests through continous vigilance and control efforts.

- Field research to refine general and soil test recommendations was conducted throughout Alberta using fertilizer, lime, gypsum and tillage treatments on a wide range of normal and problem soils.

- The Agricultural Lime Freight Assistance Program (ALFA) provided grants to farmers for transporting liming materials to reduce soil acidity. Grants in the amount of $110,017 to 39 applicants for transporting 4,624 tonnes of lime or marl were paid out. This is down from $315,000 in grants paid out in the previous year, the result of restricted cash flow to the grain business.

- The Farm Fertilizer Price Protection Plan provided grants to farmers to reduce the cost of crop production inputs. Grant payments continued at $50. per tonne of nitrogen (N) and $25 per tonne of phosphate (P_2O_5). Early in the year the program was extended to July 31, 1988. During the third fiscal year of the program, $17,415,000 was paid on 791,415 tonnes of fertilizer. This compares to $17,606,351 in grants in 1986/87. Since the inception of the program in April, 1985, $56,000,000 has been paid to producers.

- The research section of Field Crops Branch obtained approval for registration of a new two row feed barley "TR607". Breeder seed of this new variety will be issued to select seed growers in the spring of 1989.

- Seventy-seven municipal co-operative seed plants processed 29.9 million bushels of cereal and oilseeds. This was an increase of 4.2 million bushels from the 1986-87 year.

- Fifty-seven municipal co-op seed plants received provincial grants totalling $512,743.00 for the purpose of upgrading their plants. The provincial share is 40%; municipal authority 20% and the local seed plants association contributes 40%. The average grant was $8,995.00. No new plants (replacement) were established in the 1987-88 year.

- Thirty-six "Grow with Canola" on farm demonstration sites clearly showed a 25% increase in yield is obtainable through management changes.

- Ten forage associations continue to increase regional awareness of the value of forages. The appointment of a forage agronomist specializing in annual forages was made to support the need for more work in this area. A 10 year project on grazing native vs. crested wheatgrass was set up near Hanna.

- Thirty-five test sites were operated throughout the province to evaluate licensed varieties of cereals and oilseeds.

- Division staff participated in a range improvement project in Qiqihar in Heilongjiang province in northern China and in an oilseed project in India.

- Micropropagation of saskatoon was expanded to meet the industry demands and additional cultivars were studied. Tissue culture developmental work was done on chrysanthemums, geraniums, sour cherry and chokecherry for direct commercial application.

- The increased area of greenhouse production in central and northern Alberta was mostly devoted to Alstromeria production with some increased area to lettuce and seedless cucumbers.

- Cultural studies were conducted to evaluate the effect of plant populations on yield and maturity of several vegetables. Fall seeding of several vegetables crops was evaluated with encouraging results for crops such as carrots and spinach.

- Special efforts were made to introduce new cultivars of potatoes to the commercial industry in a more direct manner. A number of cultural or production trails designed to improve technology for potato producers were conducted. Seed management, in terms of seed piece size, uniformity of seed lots, received attention.

- The seed potato program provided 58,600 pre-elite tubers to Alberta seed potato growers. Several techniques to improve tissue culture production and disease detection were introduced into the program. Particular efforts were made to improvement of quality. Emphasis was placed on greenhouse production of nuclear tubers. During the year an assessment of the U.S. North-west seed market of which we are a large supplier, resulted in several program changes. The major shift is to increase nuclear tuber production, to more than double previous levels to reduce by one generation the seed of commercial usage.

- Several varieties of day neutral strawberries were introduced to Alberta producers. These varieties proved to be very successful and have resulted in a large commercial planting in the spring of 1988. A saskatoon survey was completed and it will be used for future program planning.

- The protected crops program is gradually shifting more to cut flower production. Studies also continued on various greenhouse vegetables. Pest management in commercial greenhouses received a high priority. A task force of Plant Industry Division and Alberta Environmental Centre staff tackled the Western Flower Thrip problem which escalated during the year.

- In excess of 1,200 specimens were received at the laboratory in Brooks, and approximately 600 at the laboratory in Olds. A computerized record system was developed and is functioning.

Branch Activities

CROP PROTECTION BRANCH

Summary

The Crop Protection Branch continued efforts to enhance farm income and increase security of crop production by reducing losses caused by weeds, insects, plant diseases and problem wildlife. In addition, the branch administers the apiculture program of the department.

Major activities include administration of the Weed Control Act, The Agricultural Pests Act and the Bee Act. Efforts used focused on extension, education, preparation and packaging of technological information for delivery to farmers and staff training.

In the past year staff levels were effectively reduced by 3 person years. Two positions were abolished and one was replaced by an employee who formerly worked on rat control via a contract with Special Areas.

Mr. Arnold Stearman, Mr. Jens Jensen Skow and Mr. George Sproule all took advantage of the Department's early retirement option. Several vacancies were filled and the following new staff were welcomed: Mr. Paul van Westendorp, Provincial Apiculturist; Ms. Lorraine Harrison, Regional Plant Pathologist; Mr. Jim Jones, Extension Entomologist; Mr. Les Anderson, Problem Wildlife Specialist.

BRANCH ACTIVITIES

WEED CONTROL SECTION

Responsibility for weed control remains with the landowners as designated in the Weed Control Act. The purpose of the Weed Control Section is to develop and manage weed control programs which will reduce losses to the agricultural economy and do so with the least environmental impact.

Trends observed in 1987 were:

- Continued weakness in farm commodity prices resulted in lower spending on weed control. Farmer interest in any device or technique which promised control at lower costs was keen. Herbicides were often applied below the recommended rate and farmers accepted reduced control levels.

- Continuous cropping coupled with reduced tillage continued to gain popularity. These practices are causing changes in the weed species spectrum. Toadflax and spreading dogbane are both increasing. Other perennials continue to cause problems. The Branch is actively pursuing some solutions through our weed research section.

- The agricultural chemicals market was virtually unchanged from 1986 at about $148,000,000 retail sales. The industry continued to consolidate and downsize.

- Farmers searched desperately for alternate crops due to the limited economic opportunities available in traditional cereals and oilseeds. The trend toward trying new crops has created a situation where there are few pesticides registered for these crops but there are significant pest problems. The farmers are trying unregistered materials as a result. This is also creating a demand for technical information which we are unable to supply because of the legal implications of using unregistered products.

a. Knapweed Eradication Program

Knapweed (diffused and spotted) was first confirmed in Alberta in 1974. A survey in 1975 revealed a total infestation of approximately 300 acres. Infestation levels varied from a single plant to 2 acres spread over 2 million acres of rangeland, transportation corridors, industrial sites and waste areas in Region 1. Based on the knapweed experiences in Montana and British Columbia, Alberta Agriculture decided to prevent the establishment of these weeds.

The eradication program was initiated in 1976 but did not get fully established and workable until 1980 with the passage of the revised Weed Control Act. The designation of a restricted weed category provided the legal basis to fully launch the eradication program.

Through a major awareness campaign together with eradication measures by all levels of Government and the landowner the spread of knapweed has been stopped. By 1986 the 300 acres have been reduced to scattered plants. Knapweed free buffer zones have been established at the Alberta/Montana and Alberta/British Columbia borders with the co-operation of personnel from the State of Montana and the Province of British Columbia. With this support and the inspection of hay, the movement of knapweed across these borders have been virtually eliminated.

During 1987, the search and destroy approaches continued. Four new infestations were found and treated. All old sites were inspected and none were out of control.

b. Nodding Thistle Eradication Program

The first infestation of nodding thistle in Alberta was reported in 1978 in NE Calgary. It varied from single plants to clusters spread over several acres. A survey in 1979 revealed infestations in M.D. of Willow Creek, County of Wheatland, County of Beaver and the M.D. of Starland.

In 1980 a nodding thistle eradication program was undertaken. By 1982 infestations in County of Wheatland, County of Beaver and M.D. of Starland were eradicated. By 1985, infestation levels in the City of Calgary and M.D. of Willow Creek were reduced to isolated plants.

During 1987, the seek and destroy approaches continued. No new infestations were found. All old infestations were inspected and treated if necessary.

c. "Crops of Alberta"

The theme for this year's Crops of Alberta demonstration plot was "Through the Decades"; an illustration of the progressive improvement of varieties over the last 70 years. The plot was viewed by many casual visitors, dignitaries and fellow personnel. It was also used as a teaching tool for over 400 urban elementary school children and a living laboratory for agricultural students from the University of Alberta.

d. The Weed Alert Program

The program continued to provide information on the distribution and status of control efforts for certain key weeds. This program provided a continuity of information even when municipal officials changed. The mapping capabilities of this program have been extensively used by other branches and divisions.

e. Co-operative Project with the Industrial Vegetation Management Association of Alberta

This project on the inactivation of residual herbicides is nearing completion. The evaluation of the response of specific field crops planted in sites reclaimed through the use of various soil amendments continued. The objective is to bring agriculture land sterilized for industrial purposes back to its original productive state.

f. Weed Research and Development Projects

Twenty-nine projects were undertaken to discover effective weed control techniques for some of our problem species and develop practical control procedures using these discoveries. Projects were conducted in the six regions.

- Six projects involved the control of scentless chamomile in both cereals and forage crops; two were devoted to a similar plant, ox-eye daisy which has become established in west central parts of the province.
- The increase in continuous cropping combined with reduced tillage has caused the incidence of toadflax to increase. This has stimulated toadflax control work in summerfallow and cereal crops.
- The weed problems associated with the establishment of forage crops stimulated investigations in two key areas. The first area was the tolerance of forage legumes and grasses to a number of different herbicides. The second area investigated was the effect of weed control in the establishment year on the longevity of the stand. Information obtained is designed to fill information gaps and to assist Alberta farmers in producing better forages.
- The testing of the bioherbicide (Biomal) for the control of round-leaved mallow was also undertaken. The presence of this product, which is a disease organism, to control a specific weed may be the first in a trend away from chemical herbicides to biologically produced herbicides. Since this product was discovered and developed in western Canada, it may signal a potential new industry for this area.

   - Other problem weeds addressed were common tansy, white cockle, tall buttercup, milkweed, pasture sage and water hemlock.

g. Another weed receiving major attention is scentless chamomile. This has occurred through significant awareness campaigns, continued research on control measures and extensive control programs conducted by municipalities. Over 50% of the service boards conducted control programs; some have placed chamomile on the restricted list and are eradicating all identified infestations, while others have learned to live with the problem. Border friction between municipalities with high chamomile control standards and those with a lower standard has occurred.

h. The need for accurately calibrated spraying equipment is essential to good weed control. To address this need, 29 spray clinics were conducted with agricultural service boards and agribusinesses in all six regions of the province. While producer interest in new application technology is always present, much benefit can be obtained with more effective adjustment and use of many of the units that are currently owned by farmers.

i. Municipalities with the strongest weed control efforts operate on a balance of information, service and regulatory programs. While the use of the Weed Control Act in 1987 was judicious, the timeliness and the appropriateness of the use greatly strengthened the weed control programs.

j. Work on the control of weeds through the use of biological organisms, such as, insects and plant disease is increasing. Insect releases have been made on leafy spurge, Canada thistle, toadflax and perennial sow-thistle. Of the four insect species released on leafy spurge, one is surviving and has increased in numbers and area since its original release in 1983. The time frame required to establish a biological control is 10-20 years but the benefit is great since once established, additional control may not be required.

ENTOMOLOGY, PLANT PATHOLOGY AND APICULTURE SECTION

Responsibility for prevention and control of insects, plant disease, and honey bee pests remains with the producer as designated in the Bee Act and Agricultural Pests Act. The purpose of this section is to develop pest management strategies and programs which aid the agricultural sector to reduce losses to pests; improve pest management decision making; and reduce the environmental impact of pest management practices.

Research at the Fairview laboratory focused in determining the seasonal phenology and biologies of the plant bugs and damsel bugs found in fescue fields in the Peace River Region. An additional years data is required to finalize the project. Since the pathologist position at Fairview and the entolomogist position at ASCHRC, Brooks were filled mid to late season, research programs were not initiated in 1987.

The Fairview regional crops laboratory continued to serve region 6 in the areas of plant pathology and entomology diagnostics. This year, as shown in Table I, 353 specimens were processed, an increase of 11% from 1986.

TABLE I

REGIONAL CROPS LABORATORY DIAGNOSTICS

	NO. OF DISEASE SPECIMENS		NO. OF INSECT SPECIMENS	
CROP CATEGORY	1986	1987	1986	1987
Field Crops	34	51	25	17
Vegetables	40	46	13	8
Ornamentals	65	75	35	53
Shelterbelts	6	2	4	2
Fruits	20	0	9	7
Miscellaneous	1		64	84
Total	166	182	150	171

1. Entomology Section

The 1987 crop year was noteworthy in that major pest problems all declined from 1986 levels. Grasshopper damage decreased dramatically with only an estimated 3-4 hundred thousand acres requiring treatment. The 1987 Grasshopper Forecast is included as a record of the change in infestation level. Brown wheat mites although abundant did not appear to cause significant damage with only 1,000 acres being treated. The transmission of barley yellow stripe disease by mites is still being investigated but implications are as yet not definite. Pale western cutworm also dropped to non-damaging levels, however, cutworm problems in the Peace River area were more prevalent than in the past few years.

The hessian fly infested fields in northeastern Alberta with some fields receiving up to 15% damage. Wheat stem sawfly continues to be a problem in some portions of southern Alberta with both the sawfly and hessian fly having potential to increase under minimum tillage situations. Barley thrips were again abundant throughout Alberta but little if any spraying occurred. Grass thrips caused damage to the flag leaves of wheat in the Westlock area, a problem not previously noticed. Alfalfa weevil continue to be a severe pest in southern Alberta requiring extensive spray programs on both seed-hay crops. Losses of honeybees were minimal in irrigated alfalfa production due to a spray co-ordination program operated by the beekeepers in co-operation with aerial applicators. Thrips in greenhouse caused extensive losses to cucumber production and intensive research into the biological control was initiated by the Alberta Environmental Centre, Vegreville.

Pscoids in stored grain were widespread and infestations of rusty grain beetle were more prevalent than in recent years, probably because of the mild winter.

Flea beetles, lygus bugs, myriads in grass crops, maggots in canola and merchant grain beetle continued to be annual problems.

2. Plant Pathology Section

(a) Bacterial Ring Rot Program

Due to manpower constraints only 50 potato growers out of 200 were inspected for bacterial ring rot (BRR) this year. The growers selected were on those farms that had BRR infections within the last 5 years. Only two growers were found to have this disease; a Hutterite colony with a 1 acre plot and a table stock grower (60 acres) in the County of Taber.

TABLE II

POTATO ACREAGE AND INCIDENCE OF BACTERIAL RING ROT IN ALBERTA - 1987

DISTRICT	NO. OF FARMS		ACREAGE		% INFESTED	
	INSPECTED	INFESTED	INSPECTED	INFESTED	FARMS	ACREAGE
M.D. of Sturgeon # 90	4	0	310	0	0.0	0.0
Co. of Parkland # 31	1	0	24	0	0.0	0.0
Edmonton Perimeter	1	0	24	0	0.0	0.0
Co. of Newell # 4	10	0	2,327	0	0.0	0.0
M.D. of Cypress #1	0	0	0	0	0.0	0.0
M.D. of Taber #14	11	1	5,116	60	9.0	1.2
Co. of Forty Mile #8	0	0	0	0	0.0	0.0
Co. of Lethbridge #26	1	0	3	0	0.0	0.0
Lethbridge Perimeter	0	0	0	0	0.0	0.0
Region 6 (Peace River Area)	3	0	136	0	0.0	0.0
Region 5 (Barrhead Area)	2	0	36	0	0.0	0.0
Region 4 (Vermilion Area)	3	0	33	0	0.0	0.0
Region 3 (Red Deer Area)	5	0	25	0	0.0	0.0
Region 2 (Airdrie Area)	2	1	43	1	50.0	2.3
Totals	50	2	8,224	61	4.0	0.7

(b) Dutch Elm Disease Program

Alberta remained free of Dutch Elm Disease in 1987. For the first time it was confirmed that in 1986 the phermone sticky traps picked up a specimen of the European elm bark beetle at Del Bonita, Port of Entry on the Montana border. No elm bark beetles were trapped in 1987.

Phermone traps specific for the European elm bark beetle are set up at 16 sites in southern Alberta by Art Tellier, Alberta Special Crops and Horticultural Research Center, Brooks. These traps are changed monthly. Elm log traps are also placed near each of the phermone trap sites to monitor for the presence of the native elm bark beetle.

(c) Diseases of Oilseeds

No problems were reported in the flax crop, (70,000 acres) though trace levels of aster yellows infection was observed in a few instances.

Head rot (sclerotinia) was reported in sunflowers (3,500 acres) and both head rot (sclerotinia) and alternaria blight were recorded in safflowers (8,000 acres). No problems were reported in mustard (20,000 acres).

In canola (2,800,000 acres), the level of the virulent type of blackleg was lower than 1986 and continues to be confined to the east central region of the province. Alternaria blackspot was common, province wide and severe in some instances in the Red Deer region. White rust, aster yellows and sclerotinia were generally at trace levels though occasional fields with up to 50% sclerotinia white stem rot were recorded.

The May 19 snowstorm and sub-zero temperatures that followed caused less damage than expected to the canola crop. Reseeding occurred in some areas, primarily as a consequence of seedling blight particularly in the Peace Region where up to 5% of the crop was resown.

Strong winds in late May and early June "blew out" a few canola fields in central Alberta. These fields were reseeded to canola or barley. Drought conditions in the central regions coupled with high root maggot infestations severely reduced yields of this crop. In the Peace region under better growing conditions, root rot was present in almost all fields, other diseases were at low or trace levels.

Irrigated canola (30,000 acres) had low levels of disease except for sclerotinia where an average infection level of 11% was recorded out of 19 fields surveyed.

(d) Cereals

Reports on winter survival of fall rye and winter wheat were good in late March and early April. Moist and relatively warm seeding conditions in early May were favorable to all field crops including cereals. The May 19 blizzard that hit most of the province with temperatures ranging from zero to 10 below damaged cereals in many areas but not to the extent that stand establishment was effected. The additional moisture from the snow cover may have more than compensated for the low temperature damage in most regions.

A relatively dry windy June into early July resulted in low to very low levels of cereal leaf diseases. Scald and net blotch on barley and septoria and tan spot on wheat were common on the lower leaves of the crop but few lesions occurred even by late July on the all important flag leaves. Moisture conditions in the Peace region resulted in somewhat higher levels of foliar disease. Bayleton, Dithane M-45 and Tilt were registered and available for cereal disease control this year.

Stripe rust appeared at trace levels on Fielder wheat during July and stem rust was not recorded on winter wheat. Barley fields were noted with traces to 10% levels of loose smut; particularly Samson, which was infected at 8, 9 and 10% loose smut at 3 separate locations. A field of Scout with 5% covered smut was also observed. An evaluation of 28 varieties of Chinese spring wheat cultivars at the University farm in late July showed that of these cultivars, more than 50% of the flag leaves and 50% of the glumes were infested with powdery mildew and septoria. Side by side rows of Neepawa and Park planted among the Chinese varieties were free of both diseases.

The new feed barley cultivars Duke and Winchester showed excellent scald resistance by mid-August when compared to moderate to high levels of this disease on Jackson and Samson.

By mid to late-August, scald and net blotch were common on most barley varieties and septoria on wheats but both crops were generally in the soft dough stage and yield losses were expected to be low, probably in the 5 to 10% range for most areas.

The visual incidence of barley yellow dwarf virus in both barley and oats was non-existent in most regions compared to 1986 when a 5% level was observable by late June of that year.

In winter wheat (Norstar) up to 25,000 acres in the Lethbridge region showed some degree of bunt infection obvious at harvest. A 1% or higher level of infection can mean downgrading of the wheat to feed status or possible rejection of the crop. Around 200,000 bushels of wheat were estimated to have this degree of contamination.

3. Monitoring and Survey Programs

(a) Pilot Field Monitoring Program

A pilot insect and plant disease monitoring project was initiated in co-operation with three district agriculturists in Region V.

In the project, 10 fields consisting of the major crops, canola, barley and wheat, were examined 3 times during the season for pest levels. Extensive sampling was involved, however, because plots were not abundant, the system did not detect any serious problems. The sampling procedure is being scaled down to reduce the D.A.s time commitment yet serve as an early detection service.

(b) Cutworm Monitoring

Pheromone trap monitoring continued at 12 locations throughout the province in co-operation with Agriculture Canada, Lethbridge, district agriculturists, regional personnel and agricultural fieldmen. The 3 years of data collected in this program are summarized in Table III.

TABLE III

ALBERTA CUTWORM SURVEILLANCE MONITORING PROGRAM
1985-87

	Bertha armyworm			Pale Western cutworm			RedBacked cutworm			Darksided cutworm		
Location	'85	'86	'87	'85	'86	'87	'85	'86	'87	'85	'86	'87
Barrhead	37	-	7	-	1	0	-	546	212	-	1	0
Brooks	97	38	31	463	213	130	2,022	1,414	1,150	417	241	629
Falher	-	11	16	0	0	-	164	1,273	-	0	0	-
Fairview	-	25	26	0	0	0	371	1,866	2,532	0	0	0
Hanna	12	-	19	389	-	158	314	-	1,594	153	-	527
Lethbridge	7	4	6	1,320	754	282	2,163	1,873	969	1,791	1,246	952
Oyen	-	-		980	961	-	558	322	-	263	175	-
Stony Plain	25	-	16	6	-	0	562	-	200	0	-	0
Strathmore	17	27	46	573	646	-	1,592	502	-	495	215	-
Three Hills	5	-	29	788	-	247	1791	-	1045	681	-	-
Vegreville	45	20	9	382	128	434	3055	2925	2418	83	33	12
Vermilion	59	-	-	55	-	-	364	-	-	-	-	-

Generally, the insect populations being monitored are decreasing and the data base developing to the point where predictions of infestations can be made with confidence.

(c) Blackleg of Canola Survey

Canola fields were surveyed by individual cooperators as indicated in the Table IV. Approximately 1 field per 20,000 acres of canola grown in each Crop District was surveyed. Blackleg was identified by visual symptoms in the field, however, the virulent nature of blackleg (*Leptosphaeria maculans*) was confirmed by laboratory tests. Each field was traversed along the path of an inverted V, and sampled at 5 spots (5 plants each) about 25 metres apart.

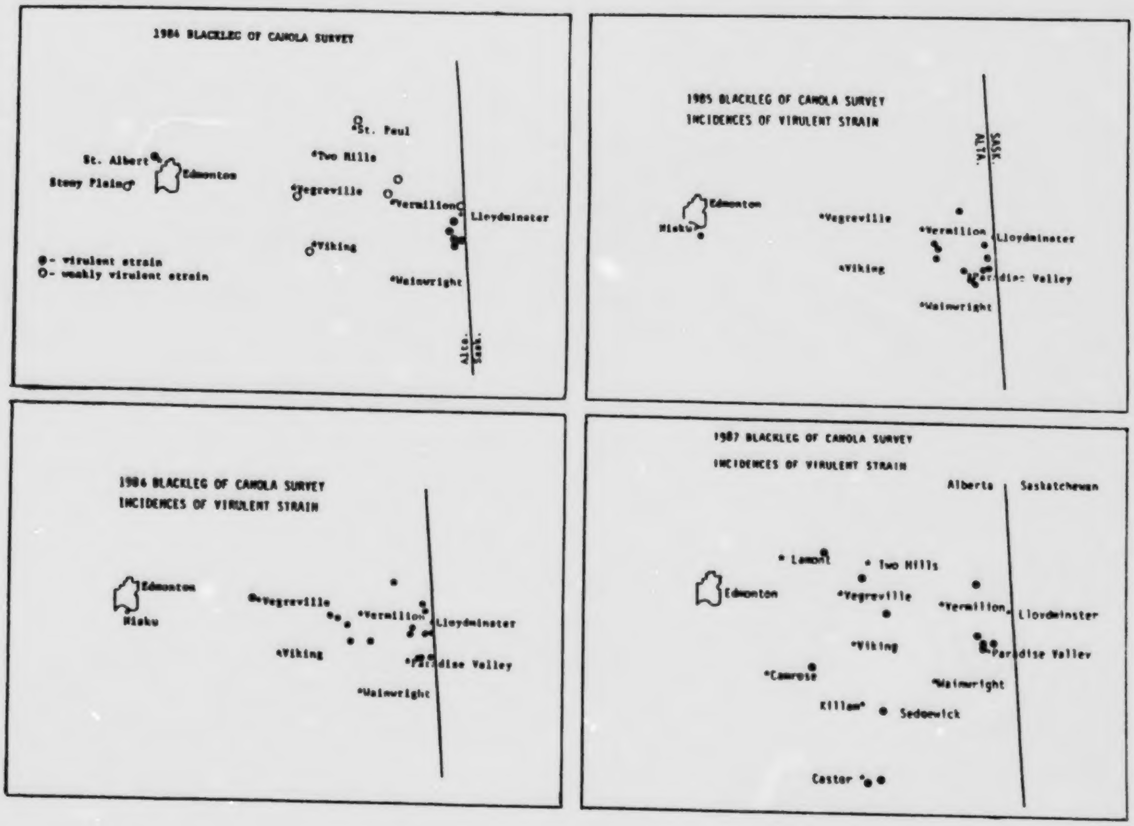
TABLE IV

Blackleg of Canola Survey

Crop Districts	Acreage (Thousands)	No. of fields surveyed	Surveyors	Fields infested with highly virulent blackleg
1+4	35,		Howard	0
2+5	222,		Howard	0
3,6+9	166,	26	Howard	0
7	460,	24	Slopek	3
10	621,	36	Kharbanda	9
8+11	358,	26	Evans	0
12,13+14	248,	9	Tewari	0
15	837,	38	Harrison	0
Province (Total)	2,947,	159	-	12

The maps below show the spread of blackleg in Alberta over the past 4 years.

Spread of Blackleg in Alberta



(d) Diseases of Canola Survey in the Peace River Area

Disease survey of canola fields was conducted in the 10 crop districts of Region 6. A total of 54 fields were examined, 11 fields of Westar and 43 fields of Tobin. The root rot complex was the most prevalent disease affecting 96% of fields observed. Incidence of staghead was high occurring in 54% of fields sampled. No blackleg of canola was found in the fields surveyed.

TABLE V

PREVALENCE AND INCIDENCE OF DISEASES OF CANOLA IN THE PEACE REGION IN 1987

DISEASE	% FIELDS INFECTED	% PLANTS INFECTED
Root Rot (*Rhizoctonia*, *Pythium*, *Fusarium*)	96	48.7
Gray Stem (*Pseudocercosporella capsellae*)	96	31.6
Black Spot (*Alternaria* spp.)	94	24.6
Foot Rot (*Rhizoctonia*, *Fusarium*)	83	13.9
Staghead (*Albugo candida*, *Peronospora parasitica*)	54	5.3
Sclerotinia (*Sclerotinia sclerotiorum*)	1	0.3
Blackleg (*Leptosphaeria maculans*)	0	0.0
Aster Yellows (mycoplasma)	0	0.0

e) Verticillium Wilt of Alfalfa Survey

The province-wide co-operative survey was discontinued in 1987. In the south only, the survey was undertaken by R.J. Howard and E.R. Moskaluk, (Alberta Agriculture, Brooks) and H. Huang and L.M. Phillippe, (Agriculture Canada, Lethbridge).

Verticillium wilt of alfalfa was found in 8 of the 111 fields surveyed as shown in Table VI. The 8 positive fields were all irrigated alfalfa in the Counties of Forty Mile, Newell, and Wheatland, and the Municipal District of Taber. These positive fields are new in addition to those found in the 1986 survey.

TABLE VI

SURVEY OF VERTICILLIUM WILT (VW) OF ALFALFA IN SOUTHERN ALBERTA, 1987

CENSUS DIVISION	COUNTY OR MUNICIPALITY	NO: FIELDS SURVEYED	NO: FIELDS WITH VW
1	Improvement District No. 1	4	0
2	County of Forty Mile	3	1
2	County of Newell	27	3
2	County of Lethbridge	4	0
2	MD Taber	5	1
2	County of Warner	4	0
3	MD Cardston	6	0
3	MD Pincher Creek	3	0
3	MD Willow Creek	3	0
5	County of Wheatland	42	3
5	County of Vulcan	3	0
6	MD Foothills	7	0
Totals		111	8

Verticillium wilt of alfalfa did show up at Edmonton on the University farm. The disease originated from greenhouse propagated research material.

(f) Silvertop in Creeping Red Fescue

Twenty-five fescue fields were surveyed between July 17 and 21 for incidence of silvertop. The results are presented in Table VII. In summary, silvertop levels were variable and ranged from zero to 239 damaged stems per 80 m transect. The Fairview area had the highest incidence of silvertop.

TABLE VII

INCIDENCE OF SILVERTOP IN CREEPING RED FESCUE FIELDS IN THE PEACE RIVER REGION, 1987

FIELDS AT EACH LOCATION	NO. OF STEMS WITH SILVERTOP/80 M TRANSECT		
	HINES CREEK	WOKING	FAIRVIEW
1	1.50	15.75	0.75
2	0.25	21.25	41.25
3	1.00	2.75	238.75
4	10.50	9.00	21.25
5	14.75	4.50	7.00
6	0.50	9.00	117.75
7	5.25	2.50	22.25
8		0.25	3.00
9		9.50	
10		3.50	

4. Apiculture Section

a) Disease Control Program

A total of 2,028 colonies were inspected during the production season of which 81 colonies (3.9%) were American Foul Brood positive. Chalkbrood was found in 181 colonies. Generally its very low, but a few beekeepers have severe infestations.

b) Alberta Beekeepers Disaster Assistance Program

In recognition of the effects of the closure of the United States border to the importation of honeybees, the Alberta Government initiated a 2 million dollar assistance program. Based on the number of colonies in operation during the 1988 beekeeping season, beekeepers were eligible for a $10 per colony payment. The program included a payment structure which allowed for application by the maximum number of beekeepers in Alberta to apply.

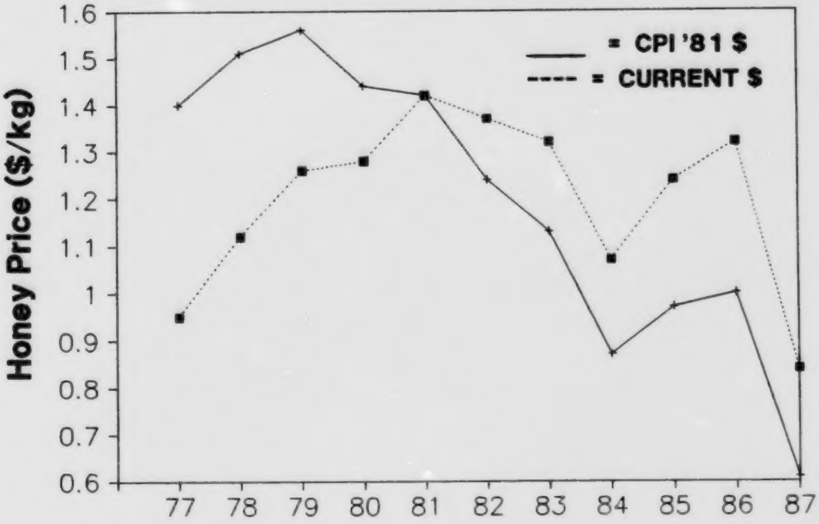
c) Production

The 1987 production year for Alberta beekeepers was marked by uncertainty, low honey prices and high production levels.

A total of 207,600 colonies produced an estimated 11.6 million kilograms (25.6 million pounds) of honey. The United States honey buy-back program has continued to depress the honey price for Canadian producers with an average price of $0.83/kg ($0.37/lb) during 1987. (Refer to Graph I).

Graph I

PRICE OF HONEY AND PROVINCIAL EARNINGS IN CURRENT AND CPI '81 $



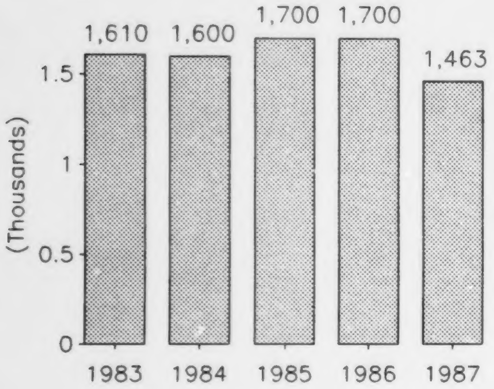
d) Registration

The total number of registered beekeepers during 1987 was 1463 while total colony count went up to an estimated 207,600 (Graphs II and III). The expansion of the industry is attributed to the beekeepers attempt to meet increasing operating costs (Graphs IV and V).

Alberta Beekeeping Statistics, 1983-87

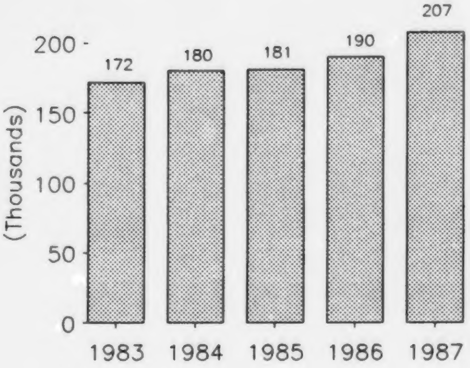
Graph II

Number of Registered Beekeepers



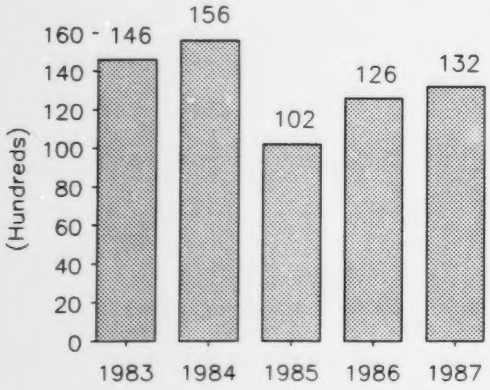
Graph III

Number of Operated Colonies



Graph IV

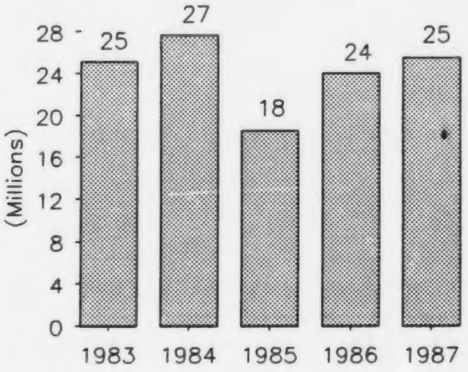
Alberta Honey Average Yield(lbs/Colony)



Graph V

Alberta Honey Production

(Millions of Pounds)



An estimated 112,000 colonies were put into overwintering which signifies a trend towards greater self-sufficiency of the industry.

e) Parasitic Mites

Since 1984, the tracheal mite Acarapis woodi threatened the North American industry and while its distribution was limited to parts of the United States, a certification program and control zone was established in California to ensure mite-free bee importations into Canada.

In the spring of 1987, Alberta imported an estimated 145,000 packages almost exlusively from California.

In September 1987, the parasitic mite Varroa jacobsoni was discovered in the United States. The federal government imposed a temporary bee importation ban, which was extended for two years on December 31, 1987. The border closure is expected to have a serious effect on Alberta's beekeepers in 1988.

f) Queen Production

In an effort to lower the industry's dependence on the importation of beestock, more beekeepers raised their own queens during 1987. Fairview College produced a few thousand queens for sale. Several Alberta beekeepers established queen rearing operations in B.C. for the 1988 production year.

g) Pesticides

The incidence of honeybee colony losses due to pesticide poisoning was greatly reduced because of increased and communication efforts between beekeepers and pesticide applicators.

Problem Wildlife Section

Responsibility for prevention and control of wildlife depredation of crops and livestock remains with the producer, with assistance from the Municipal Agricultural Service Boards and A.S.B. Fieldmen.

The Problem Wildlife Section is responsible for the supervision and coordination of three major programs: rat control, rabies suppression in skunks, and prevention and control of coyote depredations of livestock and poultry. In addition, the section provides extension services for the prevention and control of crop or livestock damage from field rodents (primarily pocket gophers and Richardson's ground squirrels), nuisance birds (primarily magpies, blackbirds, sparrows and pigeons) and other mammals that conflict with human interests (bats, rabbits, porcupines, and squirrels).

a. Rat Control Program

Alberta was kept essentially free of Norway rats for the 37th consecutive year. Rat control was conducted in seven rural municipalities along the Alberta/Saskatchewan border in a control zone 30 km wide and 600 km long.

The control program was similar to previous years. However, there were changes in manpower and staffing. The pest control inspector's position in the Municipal District of Cypress was changed from a full-time to a half-time position in June, 1987. The problem wildlife specialist at Brooks retired in June, 1987. This position was transferred to Oyen and filled with the pest control inspector from Special Areas. Alberta Agriculture also assumed responsibility for rat control in the Municipal District of Acadia on April 1, 1988. Control in the Municipal District of Acadia will be the responsibility of the provincial problem wildlife specialist in Oyen. These changes will result in an annual reduction of 1.75 person-years to the problem wildlife section and rat control staff. In total 6.25 person-years were spent on rat control in addition to coordination and administration by section staff.

A relatively open winter, spring and fall contributed to an increase in rat infestations and required an additional 912 inspections over the previous year. The bait used in the control program also increased by 3,299 kg of dry warfarin cereal bait and 615 L of water-soluble warfarin over that used in 1986 (Table VIII).

A total of 8,973 inspections of farms, grain elevators and other premises were conducted by municipal and provincial pest control inspectors. Each premise was inspected from 1-3 times during the year. Infestations were eradicated by the cooperative effort of residents and government personnel.

Within the interior of Alberta, suspected rat infestations continue to be reported by a concerned public. Most complaints were found to be muskrats, pocket gophers, wood rats or mice. Regardless, all suspected infestations were investigated by provincial and municipal pest control officers. One solitary rat was confirmed within the interior of Alberta at an agricultural machinery equipment yard.

TABLE VIII

NORWAY RAT CONTROL ON THE ALBERTA/SASKATCHEWAN BORDER, 1987

MUNICIPALITY	PERSON YEARS	BAIT USED DRY(KG)	BAIT USED WATER SOLUBLE(L)	INSPECTION OF PREMISES	INFESTATIONS 1985	INFESTATIONS 1986	INFESTATIONS 1987
Bonnyville	0.50	500	5	1,260	1	1	1
Vermilion River	1.75	4,444	443	2,583	23	29	66
Wainwright	1.00	351	52	1,506	0	0	0
Provost	1.00	3,530	738	1,676	39	39	26
Special Areas	1.00	2,115	585	893	9	24	33
Acadia	0.25	336	104	336	0	0	0
Cypress	0.75	768	30	719	0	0	1
	6.25	12,044	1,957	8,973	72	93	130

b. Rabies Vector Control

The program to prevent the spread of rabies in Alberta, primarily in skunks, continued under the direction of the Central Rabies Control Committee.

In 1987, skunk rabies moved westward from Saskatchewan into southeastern Alberta. Twenty-one skunks and 2 bovines were confirmed rabid within the M.D. of Cypress alone. Skunk depopulation was conducted along the Alberta/Saskatchewan border from the M.D. of Provost to the United States. In total 1,548 skunks were removed from this 40 km wide buffer zone. To further curtail the westward movement of skunk rabies, the Minister of Agriculture declared ranges 1 through 4 a "rabies vector control zone."

In addition, 12 rabid skunks were collected throughout the interior of Alberta. This included the County of Forty Mile where 6 rabid skunks were removed near Etzikon and Manyberries. Because transplanted populations of swift fox occur near Manyberries, "trapping-only areas" were designated. Elsewhere, 2 rabid skunks were reported north of Brooks, County of Newell, 3 rabid skunks were found east of Milk River, County of Warner and 1 was found near Ryley, County of Beaver.

TABLE IX

RABIES POSITIVE ANIMALS IN ALBERTA

	SKUNKS					
YEAR	WARNER/FORTY MILE	NEWELL	ELSEWHERE	BATS	OTHER	TOTAL
1979	3	0	10	12	0	25
1980	53	0	1	11	1 cat	66
1981	22	1	0	9	1 dog	33
1982	14	29	0	7	1 horse	52
1983	27	3	2	5	3 cats	40
1984	4	3	0	5	1 dog	13
1985	6	1	1	4	1 human	13
1986	0	1	0	5	0	6
1987	9	2	22	7	2 cats 2 cows	44

Throughout Alberta 1,933 skunks were removed in 1987. Over 80% of these skunks (1,590) were taken with strychnine egg baits.

Trapping and shooting accounted for 343 skunks. In all, 3,601 poison eggs were placed at 967 sites, usually in small culverts or under abandoned farm buildings. Strategic placement of these poison baits added to the safety of the program and reduced non-target poisoning to only 13 recorded cases, 7 red fox and 6 badgers.

Bat rabies continues to demonstrate a low incident rate with only 7 confirmed cases of rabid bats in 1987.

c. Coyote Depredation Prevention and Control

The primary objective of the coyote control program is to train producers to resolve their own problems with assistance from municipal agricultural fieldmen. Provincial problem wildlife specialists train agricultural fieldmen, assist with difficult cases and assist farmers when fieldmen cannot respond to requests for control.

Non-lethal preventive techniques such as electric fences and guard dogs are promoted. Their use is now an accepted technique to prevent coyote predation. An electric fence about 15 km in length was built around the sheep pasture at Kleskun Lake grazing reserve in early 1987. This pasture grazes in excess of 2000 sheep and usually loses in excess of 100 animals to coyote predation each year. There were only 3 missing sheep and no confirmed losses to coyotes in 1987 after the electric fence was completed.

Coyote control relies heavily on the judicious use of toxicants. Human safety is emphasized. In addition, the importance of proper placement of toxicants is stressed to minimize non-target poisoning of wildlife and domestic animals. Cyanide guns and strychnine baits are still important tools for coyote control (Table X), although single lethal dose 1080 baits, registered for use in 1984, have become the most commonly used toxicant. In comparison to strychnine, single lethal dose 1080 baits are more specific to members of the dog family and less hazardous to humans, wildlife and domestic animals.

Eight large 1080 baits were set by the M.D. of Cardston during winter, 1987-88.

TABLE X

TOXICANTS AND DEVICES DISTRIBUTED FOR COYOTE CONTROL

Year	Cyanide Shells	Strychnine Cubes	Single Dose 1080	Snares
1984	1,175	4,184	147	--
1985	873	2,609	346	--
1986	482	2,166	558	141
1987	565	1,567	1,769	93

The number of cases of predation handled by Problem Wildlife staff decreased from 304 in 1986 to 237 in 1987 because no temporary staff were hired in 1987. Number of cases handled by permanent staff were almost identical in 1986 and 1987; that is 241 and 237, respectively. Most cases involved coyote predation of sheep and calves (Table XI).

TABLE XI

NUMBER OF CASES OF PREDATION INVESTIGATED BY PROBLEM WILDLIFE STAFF, 1987

	PREY					
PREDATOR	SHEEP	CATTLE	HOGS	POULTRY	OTHER	TOTALS
Coyote	120	60	1	16	2 (dog, goat)	199
Dog	15	5	0	0	0	20
Wolf	1	3	0	0	1 (goat)	5
Other	2 (fox, lion)	0	0	6[a]	5 (raccoon)[b]	13
Totals	138	68	1	22	8	237

a 2 skunks, 1 weasel, 1 fox, 2 raccoons

b stored feed

The number of cases of predation handled by Agricultural Fieldmen has varied among years but is neither increasing nor declining (Table XII).

TABLE XII

TOXICANTS ISSUED FOR COYOTE CONTROL BY AGRICULTURAL FIELDMEN

YEAR	NUMBER OF CASES	TOXICANTS ISSUED	TOXICANTS PER CASE
1984	520	4,125	7.9
1985	528	2,933	5.6
1986	398	1,945	4.9
1987	513	2,530	4.9

SOILS BRANCH

Summary

Technology transfer, applied research and diagnostic activities were provided to department staff and directly to producers. As farmers coped with narrow cost-return margins more efficient crop production on problem soils and use of inputs e.g., fertilizer continued to be in high demand.

Activities were carried out for the second year following re-organization whereby increased emphasis was placed on field research and laboratory analysis methodology.

Two employees took advantage of the Early Retirement Incentive Program. They were Mr. Don Laverty and Mr. Siegfried Harke. Mr. Laverty had been Director of the laboratory since 1958 when it was located on the University of Alberta campus.

The fees for soil, plant and animal feed testing were revised effective August 1, 1987. Fees were increased to more adequately reflect those in the private sector. The change is in line with the government's policy of having the private sector provide services. The laboratory's role is now one of methodology research and development and providing unique analytical services to staff and the private sector.

BRANCH ACTIVITIES

a. Agricultural Lime Freight Assistance (ALFA) Program

Financial assistance for transporting materials for liming acid soils has been available since 1981. Eighty (80) per cent of the transportation costs above $5.50 per tonne is paid as a grant to qualifying farmers. A total of $110,017 was paid to applicants to transport 4,624 tonnes of lime and marl. A summary of the program activities is shown in Table XIII.

TABLE XIII

AGRICULTURAL LIME FREIGHT ASSISTANCE PROGRAM - SUMMARY

	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88
No. of applicants	62	92	149	81	87	69	39
Total grants ($)	150,994	349,363	645,359	302,743	335,039	315,164	110,017
Number of tonnes	4,514	11,289	21,487	11,493	12,275	11,606	4,624
Average grant per tonne ($)	33	31	30	26	27	27	24
Average grant per applicant ($)	2,435	3,797	4,331	3,738	3,851	4,568	2,821

The significant decrease in total and average grant payments this year was a direct reflection of farmers present situation of limited cash flow to cover operating costs rather than investing in capital items to increase production in future years.

b. Alberta Farm Fertilizer Price Protection Plan

The plan provided grants to farmers on fertilizer used for crop production on land farmed in Alberta. Grants payments of $50 per tonne of nitrogen and $25 per tonne if phosphate were made to qualifying producers. The program was announced in April, 1985.

During the 1987/88 fiscal year, total grants of $17,415,172 were paid on 791,415 tonnes of fertilizer purchased. A total of 27,473 applicants were paid an average of $634. To date $56,242,000 has been paid to producers averaging $1,550 per producer.

c. Soil Productivity and Fertilizer Use

The main activities were in extension and applied research. Extension activities involved meetings with farmers, in-service training seminars for staff and fertilizer dealers, and preparation of extension publications and resource material. Demand for in-service training of fertilizer dealers increased. Fertilizer dealers have a major influence on farmers decisions regarding fertilizer use and therefore are an important avenue for delivering extension information. The extension information focused on effective use of fertilizer and soil testing. Specific emphasis was placed on the economic effects of reducing inputs on unit costs of products.

Field research was conducted at 25 locations on dryland and irrigated crops. Experiments were conducted to measure crop response to major and micronutrients, fungicide and growth regulators on farm fields with typical management histories. The objectives of the research are to calibrate and evaluate soil tests for predicting fertilizer requirements, and to determine the need for and cost effectiveness of the various crop production inputs. Crop production systems for maximum economic yield are being developed. Supplemental funding for this research was obtained from Farming For the Future and Canada Grains Council.

Fertilizer sales in Alberta peaked at 968,442 tonnes in 1984-85 and have declined since to 835,856 tonnes in 1986-87 (see Table XIV). Nitrogen and phosphorus use decreased by 6% and 9% respectively from 1985-86 to 1986-87. Prices also dropped from the previous year. For example, anhydrous ammonia prices were

9% less in the spring of 1987 compared to spring 1986. Phosphate prices dropped 11% and urea prices by 18% during the same time period.

TABLE XIV

FERTILIZER SALES IN ALBERTA

(By Analysis and Nutrient Content)

July 1 - June 30

(Metric Tonnes)

FERTILIZER	1983-84[1]	1984-85[3]	1985-86[3]	1986-87[3]
82-0-0 (Anhy. Amm.)	187,337	187,382	157,998	131,260
46-0-0 (Urea)	226,243	245,123	222,947	222,206
34-0-0 (Amm. NO_3)	75,811	85,816	71,210	66,442
21-0-0 (Amm. SO_4)	16,757	27,215	21,885	22,883
28-0-0 (N. Soln.)	30,948	11,374	20,651	46,279
Other N	3,603	--	26,398	20,823
Urea Phosphates	--	20,687	--	--
MAP	308,149	316,874	273,370	244,822
18-46-0	207	168	74	67
16-20-0	20,888	21,338	27,114	21,292
Other	5,377	--	13,405	22,390
10-34-0 (Soln.)	3,606	1,551	1,735	--
0-0-60 (KCl)	40,313	44,951	34,572	35,140
Others	908	11,340	2,235	2,251
Mixed (N/P/K)	--	--	--	--
Elemental S	4,341	--	1,027	--
TOTAL	924,488	968,442	874,621	835,856
Nitrogen (N)	335,906	352,907	308,908	289,186
Phosphorus (P_2O_5)	166,831	170,943	154,000	140,197
Potassium (K_2O)	24,900	27,420	21,357	21,729
Sulphur (S)[2]	7,191	--	--	14,181
Ag. Lime[2]	23,060	10,242	11,853	8,388

[1] Source: Western Canada Fertilizer Association, Calgary

[2] Source: Alberta Agriculture, Edmonton

[3] Source: Canadian Fertilizer Institute, Ottawa

1. Southern Alberta

Two major plot sites were established, for irrigated crops, one at Lethbridge and the other at Vauxhall. Fertilizer response testing was conducted with 13 crops including: soft wheat, hard spring wheat, HY-320, durum, 2-row and 6-row semi-dwarf barley, canola, flax, peas, beans, sunflowers, grain corn, and silage corn at each site. Crop response curves will be developed based on the past 6 years of data for the small grain and oilseed crops. Crop response curves for irrigated special crops were reported in February, 1988 at the Alberta Soil Science Workshop. A Farming for the Future research grant provided additional funds for the small grain and oilseed crops work for the past 4 years with R.H. McKenzie as project manager.

Two long-term intensive crop management (I.C.M.) experimental sites were established, one at Lethbridge and the other at Vauxhall. Crops at each site included: Katepawa Hard Red Spring Wheat, Fielder Soft White Spring Wheat, Harrington 2-row barley, Samson 6-row barley, Global canola and Pivot canola. Each crop has 13 treatments replicated four times. Treatments include fertilizer rates and types, seeding rates, and applications of plant growth regulators and/or fungicides. Crops will be rotated over the next 4 years to determine cumulative effects. This research is funded partly by Farming for the Future with D.C. Penney as project manager.

Two soil test laboratory comparison plot sites were established again in 1987, at Lethbridge and Vauxhall, The purpose of these tests was to compare analyses and recommendations of soil testing laboratories in Alberta and to determine how well the economic interests of farmers were being served. The comparisons were made with soft wheat and barley over the past 3 years. A final report was prepared and presented at the 1988 Alberta Soil Science Workshop.

Sites were established for dryland crops at Lethbridge, Pincher Creek, Claresholm, Bassano, Drumheller and Three Hills. Three or 4 crops were grown at each site including: winter wheat, spring wheat, barley, durum and/or canola. Yields and fertilizer response were good to excellent at all sites except Claresholm which suffered due to drought conditions and at Bassano which was hailed out.

In the fall of 1987, 12 sites were established at: Brooks, Foremost, Lethbridge, Vulcan, Claresholm, Pincher Creek, High River, Strathmore, Drumheller, Airdrie, Three Hills and Olds. A Farming for the Future project was approved in February, 1988 which will run for a minimum of 4 years.

Controlled growth chamber studies to measure phosphorus draw down in various soil types was studied. This information will be used to understand phosphorus cycling in soil and to possibly develop a new laboratory soil test for P. The Western Grains Research Foundation will fund this project for the next 2 years.

2. Central and Northern Alberta

Field experiments with 2 varieties of barley, wheat and canola were carried out as part of an ongoing Farming For The Future (FFF) funded intensive crop management (ICM) project. Similar experiments were conducted at Lacombe (Field Crops Branch) and Lethbridge (Soils Branch). Fungicide and plant growth regulator (PGR) treatments were evaluated on each crop variety at 2 levels of fertility and 2 plant populations. Two years of results from this study were summarized and presented at the FFF annual conference. The results show that response to the various inputs is site and year specific which indicates that rather than developing general recommendations for these inputs, reliable methods are needed for predicting when they are needed.

To supplement and extend the ICM study, field experiments to determine maximum economic yield (MEY) and calibrate soil tests were carried out at three locations. The objectives are to determine nutrient requirements for MEY with and without other inputs such as fungicides and PGR. This research is being expanded to include the evaluation of new methods of injecting fertilizers into established crops as a means of increasing fertilizer use efficiencies and reducing risk.

Experiments to evaluate the need for chloride in fertilizer programs were initiated at 4 locations in cooperation with the University of Alberta Soil Department. Chloride has been shown to reduce crop disease under some conditions and a soil test for Cl has been developed at South Dakota State University. The objects of the study were to determine the effect of Cl on yield and disease levels in barley and to evaluate the South Dakota soil test.

A project to determine the extent of copper deficient soils was initiated. A field experiment in the Stony Plain area identified Cu deficiency at a soil test level higher than previously reported. A survey of fields with a history of stem melanosis of wheat which has been associated with Cu deficiencies and a summary of soil test results were completed. The preliminary results indicate a significant acreage of potentially Cu deficient soils in central and northern Alberta. Additional field experiments are being established to verify the extent of the problem and to calibrate the soil test for Cu.

d. Problem Soil Management

Main activities of staff involved extension and research relating to solonetzic, luvisolic, organic and acid soils. Extension meetings focused on improving production efficiency on problem soils by adopting soil improvement techniques such as deep plowing, ripping (subsoiling), and the use of lime and gypsum. Research activities concentrated on assessing research needs through liaison with farmers, researchers, extension staff, industry, local governments, and farm organizations.

1. Solonetzic Soils

Crop response to deep plowing, ripping, and amendments were obtained from 28 trials. The 1987 wheat response to deep plowing and ripping is presented in Table XV. These trials show deep plowing has a long term beneficial effect on crop yields; further research is required to determine the long term effect of ripping on crop yields.

TABLE XV

WHEAT RESPONSE (BU/AC) TO DEEP PLOWING AND RIPPING BY SOIL ZONE

SOIL ZONE	DEEP PLOWED	RIPPED
Brown	6.7 (4)*	9.1 (3)*
Dark Brown	-1.9 (1)	4.9 (8)
Thin Black	5.2 (2)	6.3 (3)

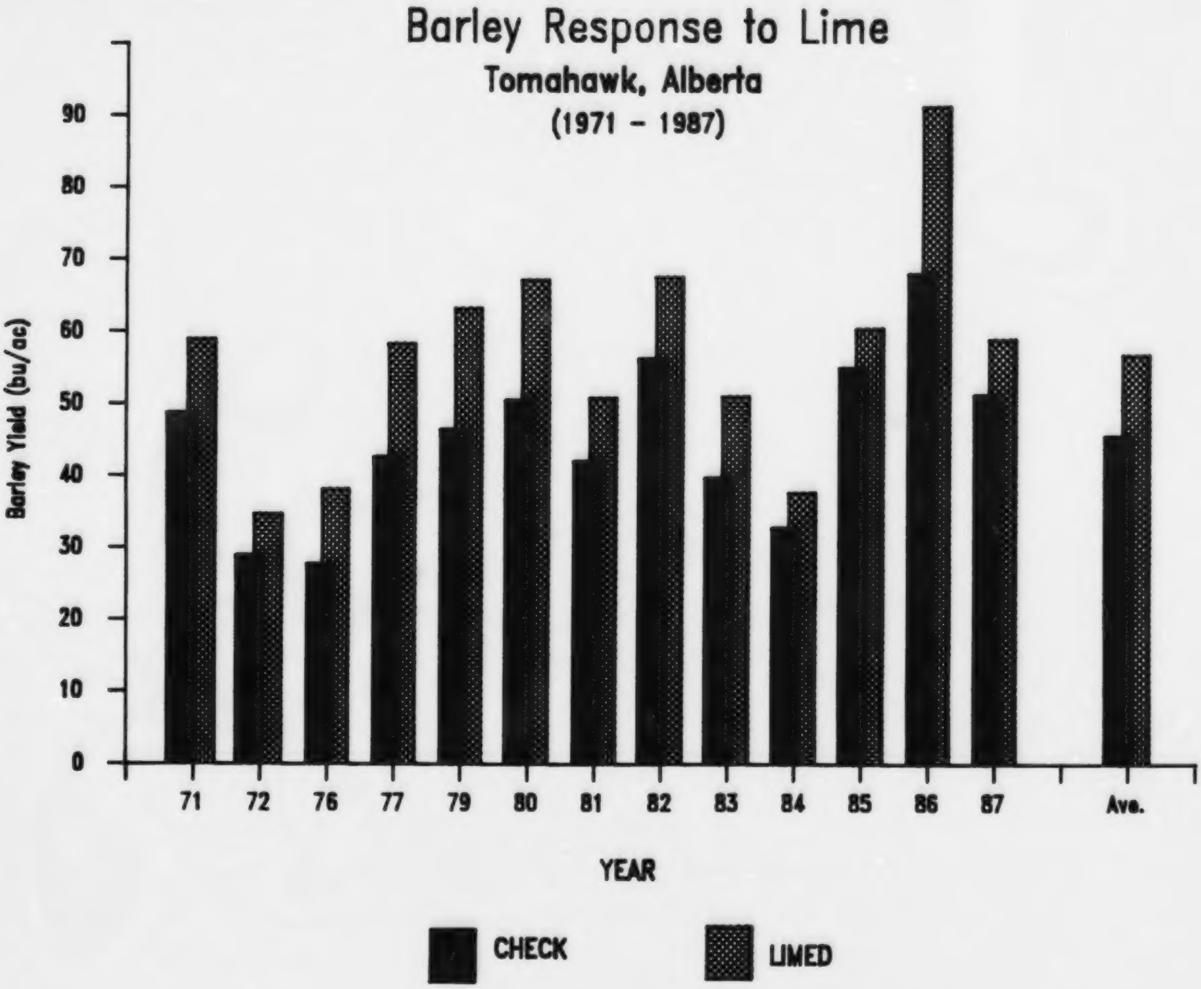
*( ) number of sites

Three trials were monitored to evaluate the use of waste gypsum as a calcium source on Solonetzic soils. Preliminary results from research trials have been very encouraging with yield increases averaging 7, 11 and 15 bushels per acre annually for wheat, barley and oats respectively. An additional 7 trials were established to complement existing ones to determine the amount of gypsum required and to measure crop responses. Waste gypsum is a by-product from the production of phosphate fertilizer; it is estimated there are approximately 40 million tonnes of waste gypsum stockpiled at Alberta's phosphate fertilizer plants.

2. Acid Soils

Six trials to determine crop response to rates and forms of lime were monitored in 1987. Graph VI shows barley response to lime applied in 1970 at 2.2 tons per acre to a soil of pH 5.3. Producers have observed less soil crusting and more uniform crops after liming. One trial was established to determine the effect of lime on topsoil tilth by liming a soil with initial pH of 5.2 to pH 6.0, 6.5, 7.0 and 7.5.

Graph VI


Barley Response to Lime
Tomahawk, Alberta
(1971 - 1987)
Barley Yield (bu/ac)
0
10
20
30
40
50
60
70
80
90
71
72
76
77
79
80
81
82
83
84
85
86
87
Ave.
YEAR
CHECK
LIMED

3. Luvisolic Soils

Growth of legumes in rotation with cereal and oilseed crops has been recognized as having a long term beneficial effect on subsequent crops by improving water and root penetration of the subsoil. In addition, the improved crop growth in some soils where pipelines have been installed has caused many producers to enquire if ripping these soils would be beneficial. Nine field trials were established to monitor crop response. Yield increases of 4 to 8 bushels per acre of barley and 10 to 20 bushels per acre of oats have been obtained. Field work will continue to monitor crop yields.

4. Organic Soils

Considerable interest has developed in deep plowing organic soil to increase the length of the growing season and to improve crop yield and quality. Results of a field comparison measuring the rate of frost recession in a deep plowing trial is shown in Graph VII. In the first year of

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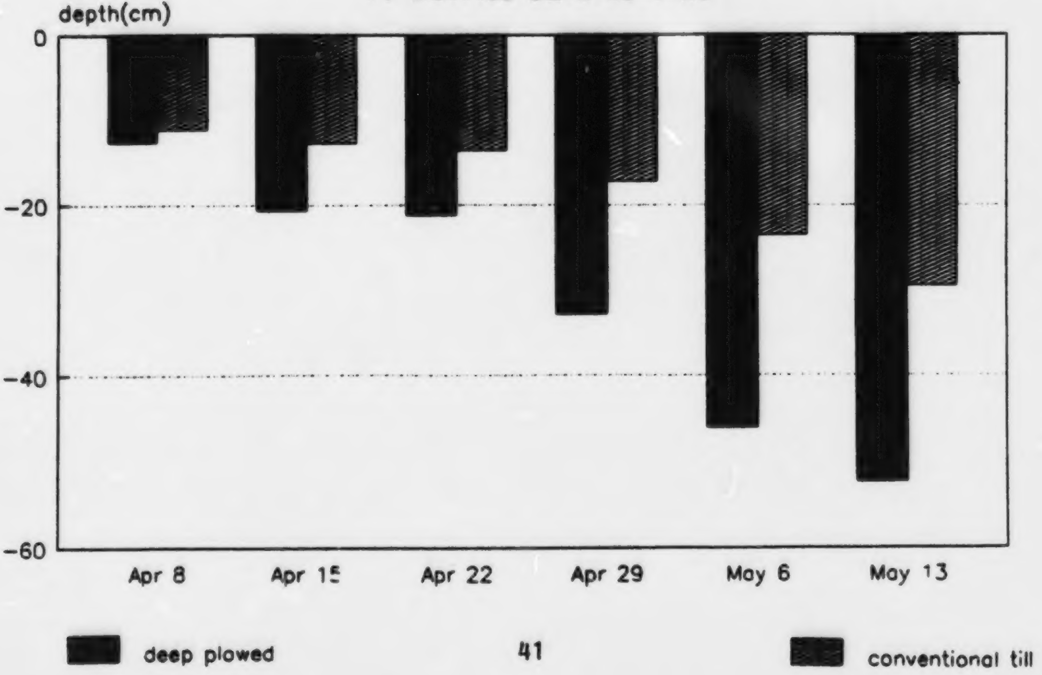
Graph VII

Deep Tillage: Frost Recession

T. Devries SE12-62-4-W5



the test no measurable difference was observed early in the spring when the topsoil was wet however the deep plowed soil thawed faster than the check when the topsoil became dry. The dry organic (check) soil became an effective insulator and slowed warming of the soil. First year crop response from 2 deep plowing trials showed a yield increase of 15 bushels per acre for barley while there was no yield increase for canola.

Soil test procedures and nutrient recommendations for organic soils were also under investigation. Fertility trials measuring barley response to phosphorus and potassium were established on 2 shallow organic soils and another trial investigating copper and manganese response of barley grown on a deep organic soil was established. No significant response in the first year to any of the treatments was obtained. Root penetration into the underlying mineral soil may have supplied sufficient potassium and phosphorus for plant growth. Further research is necessary to provide reliable nutrient recommendations for producers.

e. Laboratory Services

The Agricultural Soils and Animal Nutrition Laboratory (ASANL) has three major programs:

Program 1. Soil, Crop and Animal Feed Analyses and Recommendations Service.
To assist Alberta farmers, greenhouse operators and other producers in the economic maximization of crop and animal production.

Program 2. Diagnostic and Investigational Service.
To assist Alberta Agriculture staff in providing efficient extension and advisory services to farmers, greenhouse operators and other producers with regard to special soil, crop or animal feed problems.

Program 3. Analytical Services To Research.
To assist researchers by providing specialized services in the improvement of crop and animal production. In addition laboratory specialists monitor on an ongoing basis new analytical procedures and methodologies. These are evaluated for possible

routine implementation in the laboratory or for provision of advisory and consultant services to other laboratories.

f. Laboratory Production

Tables XVI and XVII show that during the fiscal year 1987/88 the ASANL processed a total of 15,325 soils and 12,922 plant and feed materials samples.

TABLE XVI

PRODUCER, RESEARCH AND OTHER (DEMONSTRATION/DIAGNOSTIC, GARDEN, GREENHOUSE) SOIL SAMPLES RECEIVED AND AS PERCENTAGES OF TOTAL SOIL SAMPLES FOR SPECIFIED PERIODS

SOILS

Period	Producer (%)	Research (%)	Other (%)	Totals
1984-85	6,226 (27.7)	11,773 (52.3)	4,491 (20.0)	22,490
1985-86	5,576 (27.5)	9,737 (47.9)	5,004 (24.6)	20,317
1986-87	3,657 (18.9)	9,898 (51.1)	5,798 (30.0)	19,353
1987-88	3,337 (21.8)	7,927 (51.7)	4,061 (26.5)	15,325

TABLE XVII

PRODUCER, RESEARCH AND DEMONSTRATION/DIAGNOSTIC PLANT AND FEED MATERIALS SAMPLES RECEIVED AND AS PERCENTAGES OF TOTAL PLANT AND FEED MATERIALS SAMPLES FOR SPECIFIED PERIODS

PLANT AND FEED MATERIALS

Period	Producer (%)	Research (%)	Demonstration/ Diagnostic (%)	Totals
1984-85	5,083 (24.8)	12,763 (62.3)	2,637 (12.9)	20,483
1985-86	3,592 (21.0)	11,129 (65.2)	2,351 (13.8)	17,072
1986-87	3,359 (24.5)	7,316 (53.4)	3,015 (22.1)	13,690
1987-88	2,524 (19.5)	7,209 (55.8)	3,189 (24.7)	12,922

Of the 15,325 soil samples 3337 or 21.8% were producer related, 7927 or 51.7% were from research projects and 4061 or 26.5% were submitted for demonstration/diagnostic, garden or greenhouse purposes.

Of the 12,922 plant and feed materials samples 2524 or 19.5% were producer related, 7209 or 55.8% were from research projects and 3189 or 24.7% were submitted for demonstration/diagnostic purposes.

Comparison of the 1987/88 data with the three previous fiscal years shows a marked decline in producer and research submissions for both soils and plant and feed materials. The demonstration/ diagnostic categories, although showing some annual variability, tend to be more consistent.

These figures indicate the increased role of the private sector laboratories in producer sample analyses and the downsizing of the provincial laboratory. This is consistent with current government policy.

Tables XVIII shows respectively the number and types of analyses on soils and plant and feed materials for the fiscal years 1984-85 to 1987-88.

TABLE XVIII

THE NUMBER AND TYPES OF ANALYSES ON SOILS FOR SPECIFIED PERIODS

	PERIOD			
Analyses	1984-85	1985-86	1986-87	1987-88
Regular Package	22,490	20,317	19,353	15,325
Iron (Fe)	984	1,380	2,326	1,364
Manganese (Mn)	1,141	1,106	2,470	1,336
Copper (Cu)	928	1,016	2,298	1,405
Zinc (Zn)	1,205	999	2,259	1,329
Boron (B)	628	412	1,274	1,046
Molybdenum (Mo)	181	92	101	341
Aluminum (Al)	450	375	213	27
Fluoride (F)	--	--	--	203
Organic Matter	--	--	--	2,003
Mechanical Analysis	--	--	--	378
Ash	--	--	--	537
$CaCO_3$ Equivalent	--	--	--	1,013
Lime	--	--	--	749
Bulk Density	--	--	--	187
Miscellaneous*	0	121	0	95

*Other analyses performed occasionally such as moisture, arsenic (As), chromium (Cr), Vanadium (V) and lead (Pb).

--Information unavailable

Farm mixed feeds (processed grains and grain + supplements with less than 25% roughage) - moisture, protein, calcium, phosphorus.

The numbers and variety of analyses shown in these tables illustrates the ongoing need for efficiently functioning, multi-analyses equipment systems.

Tables XIX and XX provide information on the respective use of the soils and plant and feed materials demonstration/diagnostic services by Alberta Agriculture submitters.

TABLE XIX

SUMMARY OF SUBMITTERS AND USE OF THE SOIL DEMONSTRATION/DIAGNOSTIC SERVICES FOR SPECIFIED PERIODS

	% Of Total Submissions			
	Period			
Submitter	1984-85	1985-86	1986-87	1987-88
1. District Agriculturists/Fieldmen	41	42	22	44
2. Regional and other Specialists	7	21	29	23
3. Headquarters Specialists	31	9	20	17
4. Laboratory Staff	21	28	29	16
Total Samples	1,792	1,987	3,357	1,860
Number of Reports	489	445	599	351

TABLE XX

SUMMARY OF SUBMITTERS AND USE OF PLANT AND FEED MATERIAL DEMONSTRATION/DIAGNOSTIC SERVICES FOR SPECIFIED PERIODS

	% Of Total Submissions			
	Period			
Submitter	1984-85	1985-86	1986-87	1987-88
1. District Agriculturists/Fieldmen	47	41	45	32
2. Regional and other Specialists	8	21	19	43
3. Headquarters Specialists	13	5	2	1
4. Laboratory Staff	32	33	34	24
Total Samples	2,643	2,351	3,015	3,189
Number of Reports	983	905	868	818

District Agriculturists/Fieldmen were the major users of this service in most of the fiscal years provided with greater than 40% of the submissions.

Table XXI gives a summary of the 1987-88 research projects analyses program

TABLE XXI

SUMMARY - 1987-88 RESEARCH PROJECTS ANALYSIS PROGRAM

Project Number	Name of Researcher and Project Title	Sample Volume Soils	Plants and Feeds
87-001	Ross H. McKenzie Development of fertilizer recommendations for southern Alberta	520	1,153
87-002	Dr. Bruce D. Greenfield On the introduction of wood bison to the Nisling River, Yukon Territory		58
87-003	Dr. G.W. Mathison Ruminant Feed Evaluation Unit		379
87-004	George Grainger and H. Oosterhuis Nutrient study of woody plants		144
87-005	Jerome Lickacz Liming acid soils	498	223
87-006	Jerome Lickacz Solonetzic soils deep plowing feasibility study	1,631	
87-007	Ron LaFranchise Proper soil and sod management project	8	
87-008	Rick Sherstabetoff Organic soil deep tillage feasibility study	607	416
87-009	Rick Sherstabetoff Characterization of organic soils for the purpose of improving fertility recommendations	88	2
87-010	V.S. Baron Development of sequential fiber analysis for small samples		196
87-011	Ross McKenzie Soil phosphorus study	303	
87-012	V.S. Baron Development of NIR calibrations to describe forage quality parameters in cereal species grown as silage and greenfeed		261

Project Number	Name of Researcher and Project Title	Sample Volume Soils	Sample Volume Plants and Feeds
87-013	Clive A. Schaupmeyer Relation of tissue nitrate nitrogen levels and potato quality in commercial fields in southern Alberta.		180
87-014	S.S. Malhi Fertility requirements of meadow bromegrass grown as pasture in central Alberta	71	
87-015	S.S. Malhi Fertility recommendations for Zero Tillage	256	
87-016	Y.K. Soon N P K Fertilizers for saskatoon berries	96	
87-017	Y.K. Soon Crop residue management on a Gray Luvisol soil	96	
87-018	Y.K. Soon Mountain Trail Rotations	75	
87-020	J.T. Harapiak and N. Flore Site characterization - Fall 1985 consists of minimum fertility projects	161	
87-021	J.T. Harapiak and N. Flore Site characterization - Spring 1986 Numerous annual and perennial crop trials	198	
87-022	J.T. Harapiak and N. Flore Site characterization - Fall 1986 Consists of numerous fertility projects	24	
87-023	J.T. Harapiak and N. Flore Site Characterization - Spring 1987 Will consist of a number of annual crop and forage fertility projects	75	
87-025	Colin McKenzie Safflower production under irrigated and dryland conditions	44	32
87-026	Colin McKenzie Winter Wheat Production on standing stubble	43	

		Sample Volume	
Project Number	Name of Researcher and Project Title	Soils	Plants and Feeds
87-027	Colin McKenzie Fallow - stubble project	96	
87-028	Colin McKenzie Irrigation management of lentils		32
87-030	M. Nyborg Crop available N as affected by long term cultural methods and time of soil sampling	1,330	940
87-031	Tom Jensen Annual legume plowdown to replace cultivated fallow	807	138
87-033	Garry R. Coy Nitrogen application comparison trial	52	
87-034	Doug Penney Copper and manganese requirements of organic soils	108	247
87-035	Doug Penney Evaluation of elemental sulfur fertilizers	120	72
87-036	Doug Penney Soil test recommendations for maximum economic yields	48	478
87-037	Doug Penney Chloride; a possible deficient nutrient in Alberta soils	56	576
87-038	Doug Penney Intensive management systems for barley, wheat and canola production	48	1,138
87-039	Bill Jenkins and Jim Maxwell Range grass quality of the Peace River slopes		7
87-041	Don Wentz On farm demo dryland alfalfa variety and fertilizer trial	96	
TOTALS		7,555	6,672

A total of 41 research project applications were received by the laboratory of which 36 ultimately completed. Of the completed projects, 61% of the applicants were from Alberta Agriculture, 20% were from Agriculture Canada, 8% were from Alberta Universities and 11% from private industry.

These projects yielded valuable base data for a wide range of provincial applications which included:

- soil and crop management practices
- updating soil analysis recommendations programs
- organic soil characterization and fertility requirements
- animal feeds quality and evaluation
- animal feeding management practices.

FIELD CROPS BRANCH

Summary

The Field Crops Branch operated with a staff of 17 permanent positions and 8 temporary salaried positions. The Branch is divided into two sections and an administrative group.

The branch is involved in province wide extension and research activities relating to all areas of cereals, oilseeds, and special crops. The Research Section is dedicated to the development of feed grain varieties for Alberta along with the agronomic package that goes with the variety. Variety development in winter wheat and winter and spring triticales is being pursued. Cooperative research projects are conducted in conjunction with Agriculture Canada, University of Alberta, and other branches within Plant Industry.

The Production Section provided extension and programs through department staff, private industry, producer groups, and directly to producers. Contact with all aspects of the industry are maintained by keeping a close contact with grower associations, advisory committees, and processors.

Staff conduct and participate in numerous seminars, short courses, and in-service programs across the province. Production information is developed and presented in publications for distribution.

BRANCH ACTIVITIES

Production Section

a) Cereal Crops

The major extension demand this year was in barley, winter wheat, hard red spring wheat, semi-dwarf wheat and oat production. Interest has increased in utilizing less cash inputs but to still receive the greatest economic return possible.

Input was provided to the Ethanol Fuels for Alberta ministerial discussion paper. This paper will be used to formulate the ethanol policy for the province of Alberta.

Seventy-seven municipal co-operative seed cleaning plants processed 29.9 million bushels of cereal grain and oilseeds for the year ending June 30, 1987. This amount was up 4.2 million bushels from the 1986-87 year, and 1.4 million bushels above the five-year average.

Table XXII shows the amount of seed processed in 1987.

TABLE XXII

GENERAL SUMMARY (BUSHELS)	1987
Total cleaned for Commercial Seed	23,976,499
Total cleaned for Pedigreed Seed	2,023,416
Total cleaned for Seed	25,999,915
Total cleaned for Dockage Removal	3,919,885
TOTAL PROCESSED	29,919,800
Average grain processed per plant, 1987	389,000
Five-year average grain processed per plant	370,000

There were fifty-seven seed cleaning plant grant applications under the upgrading program. The 57 applications totalled $1,385,800 absorbed by the plants, and $512,743 of provincial grant funds. This compares to 40 grant applications totalling $1,327,462 absorbed by the plants and $522,137 of provincial grant funds in the 1986-87 year. The average grant paid in 1987 was $8,995.50 compared to $13,053.43 paid in 1986-87.

As the replacement budget for new seed cleaning plants was cut this year no new seed cleaning plants were constructed. A new cost sharing formula for replacement and upgrading will be in place for 1988-89 at 30% provincial grant, reduced from 40%. Future plants planning on replacement are Willingdon in 1988-89, Rycroft in 1989-90, Three Hills in 1990-91 and Boyle in 1991-92. Our provincial replacement program provides technical and financial assistance to these plants, each of which will cost about 1.1 to 1.3 million dollars.

b) Oilseed Crops

Principle activities were directed towards technology transfer through production meetings, field tours, on-farm demonstrations, media releases, agronomic training seminars for industry field representatives and individual contacts. Numerous articles and materials were prepared and assembled for regional and district staff, educational institutes and commodity groups. Growers and industry were very supportive of these activities.

On-farm canola swathing date trials have shown that the Brassica napus variety Westar can be swathed as early as the 15% seed color change on the main stem stage with no adverse affect on yield, seed color, oil or protein content while reducing the risks of fall frost damage. Brassica campestris (Polish) varieties should continue to be swathed at the recommended stage of 30 to 35% seed color change on the main stem.

Direction and assistance was provided to the Canola Council of Canada's Grow With Canola program. Resource staff participated in the development of technology transfer materials and programs and spoke at Grow With Canola seminars. Five Grow With Canola agronomists, two of which were located in Alberta provided input and direction on the planning and development of on-farm demonstrations throughout western Canada. The agronomists developed 36 on-farm demonstration sites in Alberta with co-operating growers. The past three years of Grow With Canola demonstrations have clearly illustrated that 25 percent yield increases were obtainable through management changes in agronomic inputs over the normal production practices of the co-operating growers. These on-farm demonstrations were viewed by several thousand growers and industry people. Input and direction was provided to the Grow With Canola agronomic research projects which enhanced knowledge on sclerotinia stem rot and blackleg disease control, management practices effects on low temperature germination, soil fertility, weed control, tillage and seedling practices.

Input, direction and assistance were provided to various crop production clubs throughout the province. Growers in these clubs have modified and adopted proven research technology and achieved higher yields with lower costs per unit of production compared to their normal production practices.

Close liaison was maintained with oilseed organizations, crushers and exporters to facilitate communications within the oilseed complex and provide resource information. Two Alberta canola industry meetings were held to discuss the common concerns of the canola industry with researchers, crushers, producers, seed growers, grain handlers and government.

Resource staff participated in the Flax Council of Canada's research needs and priorities workshop to enhance future flax research of benefit to Alberta flax producers.

Close liaison was maintained with Agriculture Canada regarding the Canada/Alberta canola breeding project at Beaverlodge, Lethbridge and Saskatoon, as well as other Farming For the Future, federal and university oilseed research projects. The canola breeding project continues to develop progressively towards regionally suitable varieties for northern Alberta and for southern Alberta irrigation and dryland.

Resource staff participated in the India/Canada (CIDA) Oilseed Program to assist in oilseed technology transfer and the production of oilseed crops. They also participated in a Canola Council of Canada mission to the U.S. Pacific Northwest to evaluate spring and winter canola production and potential.

c) Perennial Forage Crops

Producer associations and councils were very active, especially the Alberta Forage Council (formally called the Alberta Forage Institute). The Alberta Forage Council expanded its mandate to represent all aspects of the forage industry on a province-wide basis. It also represents Alberta on the newly formed Canadian Forage Council.

Ten forage associations were supported with provincial operating grants totalling $314,000. The Pembina Forage Association cow-calf project and the Lakeland Forage Association hay auction are examples of local associations showing leadership in developing a more profitable forage industry in Alberta.

Hay and tame pasture yields were high in 1987. Warm weather in late summer resulted in above average second cut yields. Supplies of excellent quality hay were the highest in many years. Areas with serious feed supply deficiencies were limited to small acreages in northeastern and eastern Alberta.

Large hay supplies, a mild winter, and good supplies of feed grain resulted in very low hay prices. The price of good quality hay varied from approximately $30 per ton in areas of highest supply to about $50 per ton in southern Alberta.

Forage seed production remained fairly high in 1987 as demand from the U.S.A. kept prices high. Total pedigreed alfalfa seed production was about 2 million kg. with low yields in irrigated areas and fair yields in northern areas. Alsike clover yields were very high but acreages were low. Bromegrass seed production increased while that of timothy remained constant and creeping red fescue dropped.

A Field Crops Branch forage specialist participated in the Qiqihar range improvement project again this year. This is a project established through the Alberta Heilongjiang sister province agreement. Canadian bromegrass, timothy and alfalfa varieties continue to show adaptation to western Heilongjiang province.

New releases included the following: Pasture Management in Early Spring; Pasture Management during Drought; Forage Seed Mixtures for Planting; and Use of Alfalfa

d) Annual Forage Crops

Field Crops Branch has recognized the need for more emphasis on annual forages and has appointed a forage agronomist to specialize in this discipline.

Interest in using winter cereals (fall rye, winter wheat and triticale) for pasture is high. Good cattle prices, high perennial seed costs and low grain prices all make annual pastures an attractive alternative to either grain production or perennial pastures for livestock. Acreage figures of cereals used in this manner are very hard to determine.

Interest was also shown in other annual forages such as the kales, ryegrasses, vetches, clovers and non-dormant alfalfas for pasture usage. Annual crops for silage production concerns producers as they continually strive for higher producing as well as higher quality crops for silage. There has been considerable interest in using field peas for silage to improve quality. This has been brought on by the high profile that field peas have had in the last year.

The main crops for silage are still the cereals, and the species and varietal differences are the producer's primary concern.

e) Range Management

The range management section's principle activities were directed towards extension of technology through field tours, publications and associations.

Extension activities included speaking at district agriculturists organized field days and seminars. A range tour was organized at the Stavely range station attracting over 200 people. The product of varying grazing rates over 30 years on native range was the main attraction. The new plans for the station were discussed and viewed in cooperation with the Society for Range Management, International Mountain Section.

A 10 year grazing trial was set up near Hanna, Alberta in cooperation with the Chinook Applied Research Association. This will compare the cow-calf gains on native and crested wheatgrass pastures over several years.

A grazing plan was set up for the Antelope Creek habitat development area near Brooks. This involves a 5,500 acre ranch set up to demonstrate rotational grazing in conjunction with wetland management to produce ducks. The plan utilizes a deferred native range plan using irrigated pasture and crested wheat. The first public tour was held with wildlife specialists and ranchers attending in 1987.

Regional updates for district agriculturists in the forage field were conducted at Barrhead, Airdrie and Red Deer. The Canadian Forces Base, Suffield Range were reviewed for range condition under the P.F.R.A. community pasture operation.

A major event in ranching occurred. At least three large cattle ranches have started to graze sheep with their cattle in southwest Alberta. The use of sheep is to make more grazing use of the invading brush species.

Time was spent with a multi department committee to monitor drought in the province this year. Although a major drought was feared, rains came late and there were not any major reductions of cattle on ranges in 1987.

f) Special Crops

Alternate cropping continued to stimulate producer planning during 1987. The alternate crop acreage doubled in 1987 in comparison to the 1986 acreage. Producers planted approximately 400,000 acres to a wide range of alternate crops which are adapted to a number of regions in the province.

In southern Alberta most of the special crops experienced substantial gains. Dry bean acreage doubled to 24,000 in response to an expansion of the handling and storage facilities of the Alberta Wheat Pool bean plant. The lentil acreage expanded four-fold to approximately 60,000 acres, safflower more than doubled to 10,000 acres and the sunflower acreage experienced a small gain to a total of 5,000 acres. Mustard and corn acreage for grain and silage, experienced decreases mainly due to lower mustard prices and cheaper feed barley prices. Both crops are expected to rebound to normal or higher than normal acreages in 1988.

Throughout the rest of the province, producers favored four other alternate crop species and acreage expanded from moderate to higher levels in all. Buckwheat acreage expanded three-fold to

2,500 acres, canary seed two-fold to 10,000, fababean two-fold to 4,000 and dry pea approximately five-fold to 150,000 acres. There was a small gain in lentil acreage in the cooler, moister areas of the province. Dry peas have, as was forecast in 1987, found a home as a feed product in Europe. The domestic market is maturing slowly and remains as an exciting challenge for future years.

The special crops section looks forward to continuing its close involvement with producers, industry, other agriculture institutions and commodity associations for the betterment of the whole industry in 1988. It is hoped that special crops research will expand to serve continued growth in years to come.

g) Seed Technology

Nineteen-eighty-seven proved to be another interesting year in the seed industry. August rains brought back thoughts of the previous wet falls but soon disappeared. This resulted in a very open fall which allowed for good harvest conditions. Seed stocks were fairly good quality and supply. Forages and peas were in shortest supply. We are starting to experience the presence of private varieties in the system.

The Canadian Forage Seed Project experienced another demanding year. Interest in forage seed for 1988 was as strong or stronger than 1987. Inventories for the project remain at an all time low. We allocated 19,116 kg. of foundation seed provincially in 1987. Supplies were not adequate to meet demands. The Canadian Seed Trade Association will be responsible for the administration of the project in the future. Applications and allocations will still be handled from this office.

The Seed Technology Workshop continues to strengthen. We recorded our highest attendance ever having about 75 individuals in attendance. The seed industry has been very supportive of this endeavour.

The Alberta branch of the Canadian Seed Growers' Association had another solid year. Membership rose to 1,085 while the inspected acres stayed solid at 230,198. They maintained liaison with the respective commodity groups and associations. Banff was the host site of the 1988 annual meeting which resulted in our largest attendance ever (220). The Alberta branch hosted the interprovincial meeting and participated in the Canadian Seed Growers' annual convention.

The Alberta Stock Seed Distribution Committee reviewed approximately 60 applications in 1988. Forty of these were of the probationary nature.

Membership in SeCan still remains strong with over 2,600 members. Alberta has 645 members. SeCan varieties accounted for about 67% of the inspected acreage. They currently handle 189 varieties of which 70 are being promoted in 1988. Royalties being monies paid back to the breeding institutions, amounted to $1,458,218 distributed since 1979-1987.

Implementation of the new Seeds Act resulted in a very busy year. Requests for information meetings were very strong. Inspection fees in 1988 will be increaed by 5¢ to 40¢ and continue to be increased by 5¢ per year until 1990 to a total of 50¢ per acre.

Seed shows throughout the province continue to be successful. The major seed shows consist of Ag-Expo in Lethbridge, Calgary Seed Fair and Hay Show, Grande Prairie Seed Show, and Northlands Pedigreed Seed Show. Producers are to be commended for their continued support of these shows.

Assistance was provided to all regional and district staff as requested. This assistance was also made available to community groups, associations, Agriculture Canada, universities, colleges and the farming public.

Research Section

For the fourth consecutive year dry conditions predominated most of the early growing season. The rainfall during July and August insured reasonable crops which were taken off during the fall in good condition. The dry harvest season was the first experienced in the last 15 years. The tornado in the Edmonton area destroyed the plots at Calmar but all other sites were good.

With the release of "Noble" barley in 1987 and the approval for registration of TR607 barley, the number of registered varieties from the program resulted in, five barleys and one spring triticale. Since 1982 the provincial Treasury has received $94,743.45 from royalties and seed sales, and $111,829.81 from product sales for a total of $206,573.26. TR607 will be registered in 1988 with seed being released to seed growers for the 1989 growing season.

Work on the development of hulless barleys has led to the registration of TR607. This line is being tested by the Department of Animal Science for nutritional value in hog rations. All results to date indicate that TR607 could replace all of the wheat and from 10 to 20 percent of the soybean meal in baby pig rations.

A new semi-dwarf six-row hulless barley is presently being tested in field trials and rat trials. This variety should have higher protein and lysine values than TR607. If the feed industry accepts the hulless barleys as superior to the traditional feed varieties we see a good future for hulless barley and feed peas to meet the needs of the hog producers in the province.

In barley breeding emphasis continues to be placed on early maturity, disease resistance, and straw strength in both two-row and six-row feed types. A concerted effort is being made to develop a new strong strawed, semi-dwarf which is earlier than Samson with superior overall disease resistance. We are especially interested in developing a two-row semi-dwarf for direct combining. Nine new lines were entered into the cooperative trials for possible registration.

Seed quality, sprouting resistance and days to maturity received the primary emphasis again this year. In the spring triticale breeding program, lines with improved test weight and sprouting resistance are presently in the advanced stages of testing.

Cereal program evaluation for forage production was re-initiated in the winter. Two aspects, spring seed winter cereals and winter cereals mixed with barley, were evaluated. In the first case, fall rye provided the highest grazing yields throughout the season with the winter triticales coming a close second. In the second case, the winter triticales plus barley produced higher silage yields than either fall rye or winter wheat. In addition, there was excellent grazing after the silage crop was taken. Further work including the use of spring triticales will be carried out in the future. At present Dr. Vern Baron, Agriculture Canada and Dr. Don Salmon are cooperating on several Farming for the Future projects in this area. There seems to be a great deal of interest in using winter cereals for grazing which is probably related to low grain prices.

Emphasis was increased in the winter cereal breeding program during the 1987-88 season. Winter triticale lines having superior winter survival to the presently registered cultivars of Wintri and Decade, and equal to the best available wheats, are in the advanced stages of testing. Presently two of these are being increased. Winter wheat populations which are two weeks earlier than Northstar are presently being tested for yield, survival and agronomic adaptability.

During the summer of 1987 we lost our research agronomist when he moved back to Ontario to work on his Ph.D. In spite of that, all the research in cereal agronomy and special crops were completed on time. We will plan to carry out agronomic research again in 1988 with the expectation of having a research agronomist on staff before the 1988 harvest.

The six year rotation project at Olds was completed in 1987 along with a three year project in Lacombe. Data has not yet been analyzed; however, a new rotation project was planned for Lacombe beginning in

1987. This new project will start with 19 different three and four year rotations.

Work is continuing in the areas of intensive crop management with projects in cooperation with Doug Penney of the Soils Branch and Dr. L. Piening of Agriculture Canada. The major significant finding has been that the PGR "Cerone" seems to have a negative effect on yield and maturity. This effects seems to influence seed size, number of seeds per head and tillering. "Tilt" while controlling leaf diseases in barley does not give an economical yield increase under the conditions we experienced in Lacombe during 1986 and 1987. Higher levels of disease in the crop may be required to see an economical return on chemical disease control.

A more detailed annual report on the Cereal and Oilseed Variety Testing program and the Cereal Research program is available from the Agriculture Library in the J.G. O'Donoghue Building in Edmonton, and the Field Crops Branch Library in Lacombe.

ALBERTA TREE NURSERY AND HORTICULTURE CENTRE

Summary

The Alberta Tree Nursery and Horticulture Centre is not only involved in the production of trees and shrubs to protect and enhance farms, but also in the dissemination of production and protection information for both commercial and non-commercial horticulturists throughout Alberta.

Alberta Tree Nursery & Horticulture Centre staff work closely with the Alberta Landscape Nursery Trades Association, the Alberta Greenhouse Growers Association, Alberta Fresh Vegetable Marketing Board, Alberta Market Garden Association and the Alberta Horticultural Association, responding to their requests in increasing amounts each year and 1987 was no exception.

Two major staff changes occurred in 1987, Herman Oosterhuis retired in May after 20 years with the Department as Shelterbelt Supervisor and was replaced by Brendan Casement in September. Belinda Choban was appointed Vegetable Specialist after Phil Dixon resigned in October.

BRANCH ACTIVITIES

a) Shelterbelt Program

Some unusual weather in 1987 disrupted the production of shelterbelt material. The heavy snow, followed by the -9°C on May 19 did considerable damage to most woody plants, especially to the conifers designated for 1988 distribution. A tornado in the area on July 31 twisted some of the lathhouses and left considerable debris. The heavy rain that followed prevented field work for about two weeks, this however, was offset by extremely good fall weather.

Along with the 2.2 million shelterbelt plants provided by the Tree Nursery to farmers, there were 32,194 Colorado spruce or lodgepole pine seedlings given to Grade one students in Alberta. This program, which is more popular in the urban schools, gives young people an appreciation of plants which may stay with them the rest of their lives. The Provincial Parks in Alberta received 12,314 specially grown containerized native plants to reforest Alberta's Provincial Parks.

b) Greenhouse Program

The Greenhouse Specialist provided full extension services to the whole of the Province for half the year due to a vacancy at the Alberta Special Crops and Horticulture Research Center, in Brooks. The extension services included greenhouse visitation, fertilizer recommendations, attendance at the Greenhouse Growers Association Board meetings, teaching courses and producing Alberta Greenhouse Notes.

The Specialist also supervises a research program that deals directly with grower problems. Micropropagation of saskatoons was expanded to meet the industry demands and additional cultivars were studied. Some tissue culture developmental work was also done on chrysanthemums, geraniums, sour cherry and chokecherry.

The increased area under cover was mostly devoted to Alstromeria production, with some increased area devoted to lettuce and seedless cucumbers.

c) Non-Commercial Horticultural Program

Gardening is one of the top five leisure activities in North America. This is manifested in the demand for goods, services and information. This information is provided by the staff at the Tree Nursery in many ways. Telephone inquiries increased by 15% over last year and has increased by 74% over five years. Twenty four horticultural courses were offered throughout Alberta and staff spoke at the Farm Women's Conference, Women's Institute meetings and to Horticulture Societies. Staff also publish '*Alberta Horticulturist*' and '*Horticultural Extension Notes*'.

The demand for horticultural information was apparent in the 6,415 telephone inquiries and 134 office visits made to the Tree Nursery by horticulturists. A further 4,278 used the 'Hortline', a taped message on a pertinent topic. Inquiries resulted in 59,981 publications being distributed.

d) Vegetable Program

The specialist assisted in the continued development of the "Sun-Fresh Co-op" and provided leadership to all growers in the Red Deer, Vermilion, Barrhead and Peace Regions on production and marketing of fresh vegetables. Information was provided through '*Produce Notes*', personal contact by telephone, office visits and farm visits, as well as presenting seminars and courses to new and established growers.

Total vegetable sales in Alberta were $6.8 million to wholesalers and $5.0 million retail, mainly by market gardeners. The Sun-Fresh Co-op with 31 growers realized $1.2 million in sales of cole crops, root crops, spinach, lettuce, peas and bunched vegetables to the local wholesalers.

ALBERTA SPECIAL CROPS AND HORTICULTURAL RESEARCH CENTER

Summary

The Alberta Special Crops and Horticultural Research Center (ASCHRC) is involved in province-wide extension and research activities relating to all areas of horticulture and irrigated speciality crops. Cooperative research projects are conducted in collaboration with personnel from Agriculture Canada, University of Alberta, other Plant Industry Division Branches and the Alberta Environmental Centre, Vegreville.

Two organizational changes impacted ASCHRC operations in 1987-88. A soil and water program was established as a result of the transfer of staff and resources from the Irrigation and Conservation Division. The Seed Potato program located at Olds and the Regional Crops Laboratory were transferred to the Alberta Tree Nursery and Horticulture Centre and the Crop Protection Branch respectively.

The extension activities of ASCHRC personnel support and complement extension services provided by the other Alberta Agriculture staff centered in regional and district offices. Contact with both commercial and amateur horticulture clients is assured by maintaining a close working relationship with the industry, input into advisory committee recommendations, and involvement with grower groups and associations. Staff regularly conduct, teach and participate in numerous short courses and seminars held throughout the province. To ensure rapid exchange of information between the producer and the researcher, staff host commodity oriented field days at ASCHRC and participate in similar field days held elsewhere. Membership and active involvement in commodity advisory groups, Agriculture Canada expert committees, and industry-based committees permit the dissemination of applied research information to all sectors of the horticulture industry.

BRANCH ACTIVITIES

a) Vegetable Program

Cultural studies were conducted to evaluate the effect of plant populations on yield and maturity of several vegetables. Fall seeding of several vegetable crops was evaluated with encouraging results for crops such as carrots and spinach. This program carries responsibility for cultivar testing of a number of vegetable crops. Assistance was provided to many new growers.

b) Potato Program

The potato program is extensively involved in seedling and cultivar evaluation as part of the Prairie Regional Trial System and the Prairie Breeding Program. Special efforts were made to introduce new cultivars to the commercial industry in a more direct manner. A number of cultural or production trials designed to improve technology for potato producers were conducted. Seed management, in terms of seed piece size, uniformity of seed lots, received attention.

c) Seed Potato Program

The seed potato program provided 58,600 pre-elite tubers to Alberta seed potato growers. Several techniques to improve tissue culture production and disease detection were introduced into the program. Particular efforts were made to improvement of quality. Emphasis was placed on greenhouse production which produced a total of 40,000 tubers of a total of 70,000 produced in 1987.

d) Special Crops Program

Cultivar evaluation and improvement of production practices for a number of special or alternate crops are the main emphasis of this program. Cooperative projects were conducted with the Soils Branch, Field Crops Branch and Agriculture Canada. The program leader continues to coordinate Special Crops research for the Division.

e) Fruit Crops Program

Continuing emphasis was placed on the development of production practices of saskatoons, strawberries and raspberries. Several varieties of day neutral strawberries were introduced to Alberta producers. These varieties proved to be very successful and has resulted in a large commercial planting of these varieties in the spring of 1988. A saskatoon industry survey was completed and it will be used for future program planning.

f) Nursery Crops Program

Emphasis was placed on container production of nursery stock including an evaluation of fertility, media and overwintering. Plants continued to be added to the Center's Arboretum. Additional plantings were made at Regional Hardiness trial sites in southern Alberta. The program was without a program leader after September 1, 1987.

g) Protected Crops Program

The emphasis in the protected crops program is gradually shifting more to cut flower production, although studies also continued on various greenhouse vegetables. Pest management in commercial greenhouses received a high priority. Biological control was evaluated. The program was without a program leader after June 1, 1987.

h) Plant Pathology Program

The susceptibility of archetype dry beans to white mold under various levels of population and disease occurrence was evaluated.

Higher populations did not mean higher disease incidence. Indoor plants, such as in atriums, has provided a whole new area of research and extension. Work was done with oak-leaf ivy in respect to control of powdery mildew. A cooperative project was conducted with Agriculture Canada to gather efficacy data on fungicides used for saskatoon disease control.

i) Post Harvest Physiology Program

This program has both a post harvest physiology and a plant pathology responsibility. Reduction of Fusarium dry rot of potatoes by the application of metalaxyl fungicide was evaluated. A drench treatment was superior to foliar application. Winter squash were stored for 235 days, at which time 1 of 4 varieties was not saleable. As part of the Prairie Potato Breeding program, potato seedlings were screened for resistance to early blight and Rhizoctonia canker. A cooperative project with the Alberta Environmental Center investigated outdoor production of oyster mushrooms.

j) Entomology Program

Control of the Western Flower Thrip in commercial greenhouses was a major priority of this program. A predatory mite and chemical control were evaluated. Several insecticides were screened for insect control in a saskatoon orchard, in order to gain efficacy data. A Dutch Elm Disease and Elm Bark Beetle survey were continued at Alberta border crossings. Cutworm and European corn borer surveys were also conducted.

k) Weed Control Program

Trials for weed control, where new herbicides or candidate herbicides are evaluated for efficacy data, were conducted in most crop areas for which the center maintains responsibility. Particular attention was directed towards control of grasses in horticultural crops. Work with weed control of saskatoons was continued in the Peace River area. A herbicide persistence study (of Glean) was completed, five years after initiation.

l) Regional Crops Laboratory Program

In excess of 1,200 specimens were received at the laboratory in Brooks, and approximately 600 at the laboratory in Olds. The Brooks laboratory was without a full time diagnostician for most of the year, therefore sample submissions were curtailed. A computerized record system was developed and is functioning.

m) Food Processing and Quality Evaluation Program

The processing of saskatoons, with an effort to improve saskatoon product quality continued, as did the quality evaluation of cultivars of fruits, vegetables and potatoes.

Assistance was provided to commercial processors both in regard to quality control and equipment development.

n) Field Crops Program

This program operated three sites for regional cereals and oilseed testing. Studies with annual and perennial forages continued. A study on perennial forage seed production under irrigation was initiated.

o) Soil and Water Program

Water use studies with lentils and safflower were initiated. Several projects which were transferred from the Irrigation and Conservation Division, notably those on salinity measurement and instrument calibration, were completed. A system to automate salinity mapping utilizing a data logger and EM38 salinity meter was developed and tried by ASCHRC staff.

A more comprehensive description of ASCHRC research and extension activities may be obtained by requesting the 1987 Alberta Special Crops and Horticultural Research Center Annual Report. Details concerning research programs are available in the ASCHRC pamphlet series. These are available from the Librarian, ASCHRC, Bag Service 200, Brooks, Alberta TOJ OJO.

Regional Crop Production Reports

REGIONAL REPORTS

Region I - Lethbridge

Blair Shaw, P.Ag., Regional Crop Production Specialist
Blair Roth, P.Ag., Special Crops Specialist
Don Wentz, P.Ag., Soil/Crop Specialist

Good fall moisture in 1986 resulted in an excellent year for salinity control in 1987 in most of Region I. The Vulcan and Willow Creek areas did not receive good seasonal precipitation so yields were below expected.

There were 183 farmers and 227 projects being investigated as of spring 1988. The Dryland Salinity Investigation Service has these projects divided with 120 belonging to Alberta Agriculture and 107 to PFRA.

Reports and recommendations have been issued to 108 farmers with 67 implementing controls. Alfalfa yields continue to surpass the one ton per acre average with some yields exceeding two tons per acre. Hay prices for 1987 and 1988 were low increasing cash flow problems for conservation farmers.

Special Crops

Soft wheat acreage declined in 1987 to 237,000 acres as initial prices fell to around $1.98/bu. Good yields were obtained in 1987 but quality was affected by some sprouting and a heavy incidence of blackpoint. Leaf diseases such as powdery mildew, septoria and tan spot were very common while stripe rust was virtually absent. Yields averaged 75 - 80 bu/ac.

The number, extent and type of farm demonstrations and trials increased again in 1987 as the interest in alternative crops continued, partially due to the low prices for conventional commodities.

In 1987, special crop acreage in southern Alberta was up approximately 38% over 1986. Significant acreage increases were seen in crops such as dry beans, dry peas, lentils and safflowers.

The growing season had above average accumulation of heat units aided by a very long fall but hindered by a cool August. Warm season crops such as corn and beans yielded well and were aided by no killing frost until the third week of October. September was so dry that the dry bean harvest was hindered by over-dry seed resulting in excessive cracking and splitting.

Crop Production

Soil conservation efforts have reduced damage due to wind erosion to pre-1980 levels. There were still some isolated cases where extremely sandy soil and previous cropping combined to produce locally severe erosion. Cooperation between local governments and other government agencies has resulted in regrassing to permanent pasture in some of the more controversial situations.

The early fall moisture provided a poor harvest for early maturing winter wheat crops but excellent fall seeding conditions resulted. There were no other harvest problems.

Outside of the normal cultivated cropland weed control, the ongoing control and eradication programs for leafy spurge and knapweed were models of cooperation between agencies, governments and counties.

There were no new weeds of economic importance found in the region. Concern about scentless chamomile deepens and as a result several local counties and municipal districts have added this weed to their restricted weed category.

The brown wheat mite is still potentially a pest which has been found in several locations between Milk River and Barons. Grasshoppers were important in localized areas but the predicted collapse of the infestation had occurred. Grain storage insects continued to be a concern in the southern half of the region.

Bunt was found infecting winter wheat in an area southeast of Lethbridge. The outbreak seems isolated and likely due to inadequate seed treatment.

Region II - Airdrie

L.J. Welsh, P.Ag., Regional Crop Production Specialist

The spring of 1987 in Region II was early and very dry. The months of May and June provided little precipitation. Crops hung on through this period because of good subsoil moisture that built up from heavy rains in September of 1986. Early growth was set back significantly from a very hard late spring frost on May 20th. Temperatures dropped to -8°C. While most of the cereal crops recovered, a number of canola crops were reseeded.

July rains came in time to save the crops from drought. August was wetter than normal and crops responded well. Yields and most grades were average or better. The July and August rain encouraged some second growth. This resulted in some difficulty in obtaining malting barley grades and further caused some green seeds in harvested canola seed.

Unlike 1985 and 1986, Region II farmers enjoyed an excellent harvest. The weather was warm and dry and most of the crop was harvested by the end of September. October weather was similar and allowed ample time to complete post-harvest field work. Soils were dry and hard however, and this somewhat reduced the amount of fall fertilizing and herbicide incorporation that otherwise would have been done.

Hay crop yields were significantly reduced because of the early drought in April, May and June. Early cuts were severely damaged by the wet weather in July. Late first cuts and second cuts of hay in August and September were of much better quality and yield.

The incidence of insect and disease pests of the major crops was much reduced from that of previous years. Alternaria black spot on canola crops caused severe isolated damage in the northwest part of the region. Virulent blackleg did not enter the region as anticipated.

In an effort to reduce production costs, farmers significantly cut back on herbicides use. This was reflected by the occurance of many weedy crops throughout the region. Fertilizer use was also somewhat reduced.

The winter of 1987-88 was very mild and dry. While this assisted the livestock producer by cutting winter feed costs, the threat of wind erosion was constantly present.

Crops grown in 1987 did not reflect the depressed state of poor grain prices. A small flurry of excitement in the early spring indicated that more specialty crops would be grown, however, the increased acreage devoted to them was rather insignificant. Barley, wheat and canola again made up about 95% of the regions crops.

Winter extension courses focused mainly on financial management. Productions courses did not concentrate on any one particular issue or practice.

The importance of good soil husbandry to slow soil degration was promoted throughout the year. Field demonstrations and awareness programs encouraged farmers to reduce the amount of tillage in their farming operations. There appears to be a gradual positive change taking place in farmers attitude towards soil conservation. Low grain prices and a tight economy have been a negative force holding back this change.

The Region II Soil Management Committee worked very closely with the Alberta Conservation Tillage Society in its efforts to focus attention on the importance of conserving soil.

Seed cleaning plants throughout the region enjoyed another successful year and five of the regions 12 plants took advantage of the seed plant upgrading program.

Agricultural Service Boards appear to be increasing their budgets in spite of the continued frozen provincial grants. It is also apparent that they are increasing their efforts spent on soil conservation programs.

Several special weed problems receiving extra attention, this involved diffuse and spotted knapweed, nodding thistle and scentless chamomile. Through a strong awareness program these weeds were again held in check.

Region III - Red Deer

Wayne Jackson, P.Ag., Regional Crop Production Specialist

Snow cover for the winter of 1986-87 was very light and winter temperatures remained mild so the crop that was not harvested in the fall of 1986 due to wet conditions, over-wintered fairly well and was harvested in good condition. Spring conditions were quite dry resulting in uneven germination and reduced grain stands. Yields were down but the long, dry fall resulted in good quality of grain and allowed for considerable fall work to be done.

a. Field Crops

Yields of cereals and oilseeds were about average but quality was good. The canola acreage increased quite significantly while barley acres were down the most. The acres of special crops also increased dramatically with field peas having the most interest. Yield of field peas ranged anywhere from about 5 bus/A up to 75 bus/acre. Many of the more determinant types were grown.

Hay yields were below average and the wet conditions in July reduced quality considerably. Pastures produced fairly well but many cattle were left out to graze very late in the fall so grass growth could be very slow in 1988.

Seed cleaning plants had another good year with total volume approaching 4.4 million bushels cleaned.

b. Soils and Soil Conservation

Although some wind erosion occurred, a potential disaster was avoided because little fall work was done the previous year.

Nearly all fertilizer application was done in the spring and fertilizer dealers were hard pressed to meet the demand. Because of reduced grain prices, the total volume of fertilizer used was down - especially nitrogen.

There was increased interest in precision placement of fertilizer and of banding fertilizer into established forage stands using the Vern knives.

c. Horticulture

Requests for information on fruit and vegetable production were at an all-time high. As grain prices decrease, many producers were looking to alternate sources of income. Two major carrot operations were started in 1987. Marketing problems were the biggest concern facing new growers.

One part-time employee worked in the city of Red Deer handling local horticulture calls.

Tree orders remained high and good quality production was received from the nursery.

d. Pest Control

Damage due to pests was low for 1987 as compared to the previous three years. Grasshopper infestations were below economic thresholds and virtually no spraying was done in Central Alberta. Flea beetle and diamond back moth populations were down too.

The usual horticultural pests were present but the levels of forest tent caterpillars and spruce budworm were down and very little spraying was done to control these pests.

e. Weed Control

With the dry spring and poor financial outlook, many producers did not spray portions of their crops. Thus, weed infestations were high. Although yield loss was not extremely high, many fields now have a very high level of weed seeds for future years.

Stork's-bill spread rapidly and is now a very significant problem in the eastern half of the region.

f. Financial Situation

1987 was the second year of low grain prices. Many grain producers were in severe financial difficulty and the number of farmers who have down-sized their operations or quit completely is the highest it's been since 1940. Land prices have dropped 40-60% from their high of 1981.

Producers were considering any crop that may yield a profit and help cash flow. Only subsidy and stabilization programs prevented a disaster as farmers received about 40¢ in government payments for every $1.00 of grain sold.

g. Extension

Demand for short courses remained high with field pea production and cropping costs high on the priority list. In total, the regional crop specialist participated in 38 production meetings, conducted 33 media interviews, made 66 farm calls and visited 25 agri businesses. Producers wanted individual contact where possible to answer specific questions for their operations.

Region IV - Vermilion

E.L. Treffry, P.Ag., Regional Crop Production Specialist

The following is a short summary of some of the major trends and concerns in the Plant Industry sector during 1987 in Region IV.

a. Field Crops

Quality and yields of cereals and oilseeds were improved throughout the Region in 1987. A cool moist August improved crop growth and development. One of the driest fall seasons for many years, allowed the harvest to be completed with few hindrances. However, low grain prices, transportation tie-ups and the sluggish movement of cereals prevented farmers from realizing the potential value of an above average crop. Canola was the true "Cinderella" crop in 1987 with good sales and prices. This situation will point to a significant acreage increase in 1988.

A high interest was evident in pulse grain production, in particular peas and lentils. Yields were variable due to moisture and producer experience. However, most producers were able to sell production readily for much needed cash. In Region IV the production of peas holds much promise because of its varied uses for human and animal consumption and soil improvement capability. Pulse production will become an important part of Region IV's production systems in the future.

The 15 seed cleaning plants in Region IV continue to contribute to the quality and quantity of seed available not only to our Region but for other areas of the province. Some five million bushels of seed was processed in 1987.

b. Horticulture

The need for increased awareness and benefits of field shelterbelts is increasing each year. Larger fields and the continued removal of native trees in all locations is pointing towards more windy conditions; higher evaporation and the increased instance of soil erosion. A general lack of interest exists towards field shelterbelts, compounded by the feeling that large machinery and shelterbelts don't mix.

Ornamental horticulture centering around farmstead planning, beautification and selection of materials for rural landscaping continues to be well received. This area adds much to the beauty, pride and sense of satisfaction and achievement in rural Alberta. This avenue of extension within the rural community could be more fully utilized not only in this region but throughout the province.

The several courses that were held in Region IV on horticulture topics were well received and offered additional opportunities for contact on additional farm development topics.

Market gardening and the production of seed potatoes and some vegetable crops is becoming an alternative for several producers in the region. We do, however, lack large urban centers of population to take full advantage of these opportunities.

c. Soils & Conservation

Interest in conservation tillage was shown in several ways, one of which was a producer club who obtained and demonstrated a no-till drill. Attitudes are changing in a positive way to soil conservation practices. Demonstrations, meetings and research projects are addressing this concern in our region. A soil and crop management system approach appears to be a positive way to counteract our present monoculture of cereal and oilseed production.

The question of "working layer" compaction is being considered by a joint project of Alberta Agriculture and Lakeland College. It is hoped that future study can evaluate the effect that cultivation compaction may be having on our soils.

A major cooperative effort regarding soils, conservation and crops was initiated in Region IV under the Canada - Alberta Research and Technology Transfer Agreement. This agreement will offer the opportunity for extensive research into several areas of soils, crops and tillage which are of vital importance to all farmers. After extensive groundwork in 1987 the project will get underway in 1988 on selected sites throughout northeastern Alberta.

d. Weeds, Plants Pests and Insects

The increased emphasis on canola production has pointed out annual weeds of concern, namely the mustards, smartweeds and stinkweed. Of particular concern is wild mustard which is becoming more serious each year. Triazine tolerant canola, while giving the opportunity for chemical control of these weeds, also is lower in oil content which is a problem for the crushing industry.

Virulent blackleg of canola continued being a serious concern in 1987. The seriousness of this disease and the steady movement westward into Alberta presents a challenge to the canola industry. Through a wide extension campaign the producers have been made aware of the problem and their individual efforts may slow the spread of the disease until a resistant variety is available.

Two fields were identified as having Hessian Fly infestations. It is not known if these infestations were peculiar to 1987 in our Region or if the Hessian Fly is becoming a possible yearly insect concern.

Continuous cropping continues to encourage three perennials, couch-grass, Canada thistle and toadflax. Of these, toadflax is increasing in severity and is one of the most difficult weeds to control under all conditions.

Region V - Barrhead

Bill Chapman, Regional Crop Production Specialist

Ken Lopetinsky, Forage and Special Crops Specialist

a. Cereals and Oilseeds

Low grain prices reduced net returns on crops to below breakeven levels. Support payments, however improved returns. Otherwise more farmers would have cut inputs or experienced financial difficulty. These low prices had less affect on regional income due to a large livestock base. Livestock consume 50 per cent of the barley, 20 per cent of the wheat and 60 per cent of the oats produced in the region. This income from livestock complemented support payments to maintain total farm income.

Crop production in the region accounted for 90 to 95 per cent of the five year average 1983 to 1987.

Farmers were faced with a drier than normal spring in 1987 but with late rains, crop yields were near normal. Crop quality was better overall except for malting barley. The late July rains caused higher than acceptable levels (greater than five per cent) of black point. On average 2.5 per cent of production was accepted for malt which is fifty to sixty carloads, in 1987 on less than ten carloads were accepted. Germination of pedigreed seed was near normal, about 90 per cent. The only harvesting problem was on early seeded crops suffering from drought which caused premature ripening.

The tornado in the Edmonton area on July 31, 1987 caused damage estimated at over 10 million dollars of crops and 1.5 million dollars of farmsteads. Hailstorms did considerable damage in the path of the tornado. Calmar and St. Albert areas had near 100 per cent hail damage on 5,000 to 6,000 acres in each area.

The market development of pony oats has paid off for farmers. Oats were worth more than barley the first time in 30 years. This competitive market still has growth opportunities. By maintaining a quality product and with aggressive sales, we could market 10 to 20 per cent more next year.

The extension programs were modified from general production topics to marketing and new opportunities like pony oats. Farmer numbers were down as more continued or started off-farm jobs. The discouragement of low profits also kept farmers away. Economics were presented with all production practices as the bottom line was the primary objective.

We held joint meetings with Alberta Canola Growers in Morinville and Radway and Western Barley Growers Associations in Josephburg. It appears they have tried to be more forward and make arrangements with a few problems resulting.

The increase in crop clubs has modified the large meeting approach to smaller groups. Two new clubs in Athabasca and Leduc have increased the total to four active clubs. The Pro Gro Canola Club in Fort Saskatchewan still remains the most active but Pembina Crop Club in Westlock is improving.

Agricultural Service Boards in the region carried out a large number of projects and plots. District staff have put extra efforts into these projects, accompanying tours and plot results. Boards have changed their focus to move out of drainage and into farm water management especially in the County of Barrhead.

Seed Cleaning plant volume for the ten regional plants in the year ending June 30, 1987 was 4,908,234 bushels, 3,906,383 bushels was seed. Dockage removal and separation was 1,001,309 bushels and pedigreed seed was 386,464. Pedigreed seed cleaned was 95 per cent barley in comparison to 42 per cent of commercial volumes. The regional plants cleaned 15 per cent of provincial volume but 26 per cent of dockage and separation. Two key plants, Morinville and Stony Plain, have capitalized on this market of separations. Morinville was the first provincial plant over 1 million bushels in volume at 1,117,508 bushels.

The North West Peat Soils Association has been formalized. Eighty members from the Barrhead-Westlock and surrounding areas comprise the association. Directors for the association have been active in promoting the objectives to Ag. Service Boards and interested farmers. In the past year a soil temperature monitoring on-farm demo project was installed on the deep plowed sites. The first years results showed higher yields on the plowed treatments by 20 per cent on barley and 25 per cent on canola. The Association is also working closely with the County of Barrhead on cereal and forage plots, and the M.D. of Westlock on macro and micronutrient fertility plots.

b. Forages

Weather conditions throughout the past year were the main interest factor in the forage industry. Mild winters in the past several years have resulted in no winter injury, thereby increasing the total number of legume hay acres in the region. The dry spring conditions in 1987 resulted in lower yields of both hay and pasture, although first cut hay quality was excellent. The July heat and drought reduced regrowth expectations, however the wet August resulted in tremendous regrowth of forages, with good pasture conditions into October and November and a high tonnage second cut of high quality taken in September.

The same dry spring, hot July, and dry September positively affected forage seed average, especially the legumes. Alfalfa seed yields over 400 lbs/acre net seed were recorded. Some excellent clover and birds-foot tiefoil seed yields also occurred. Some grass seed yields, especially timothy, and foxtail, were below average due to the dry spring conditions.

Some specific forage happenings included:

(1) Continued high profile pasture management extension was seen in the Region with both the Pembina and West Central Forage Associations having successful pasture projects. The highlight was the one-half section cow-calf pasture project in the Fawcett area developed by the Pembina group.

(2) A large increase in requests for information and increase in seeded acreage of forage seed production in the Region.

(3) A large number of forage related meetings with Bob Kingsberry pasture management meetings and the dairy forage quality meeting at Nisku being highlights.

(4) An overall hay surplus in the Region was a concern, however this inventory was utilized in the spring of 1988. Feed supplies are still adequate, but not for long.

c. Special Crops

Field pea production information was a major activity. A doubling of acreage in the region highlighted field pea production in 1987. Yields were highly variable due to the weather, both dry conditions and the effects of rain and hail damage.

Yields averaged less than 2000 lbs/acre, although the range was 0 - over 4000 lbs/acre and the highest plot yields exceeded 5,000 lbs/acre.

Prices for feed quality peas increased in the fall to over $6.00/bushel from the summer contracts of $3.50 - 4.00/bushel. This fact combined with low cereal prices will result in significant acreage increases in 1988.

Some specific highlights included:

(1) The Northern Branch of the Pulse Growers Association of Alberta was very active in the Region in 1987. With the help of the F.F.F. On-Farm-Demonstration Program, 11 field pea agronomic plots were established. The highlight was the 27 variety trial in the Morinville area.

(2) The Field pea summer tour was very successful with over 225 producers attending.

(3) A field pea in-service meeting for Alberta Agriculture Staff was held in December with an excellent workshop manual being developed.

Region VI - Fairview

Mike Rudakewich, P.Ag., Regional Crop Production Specialist

For most farm producers 1987 was a successful season in the Peace River region. Spring seeding went smoothly as did crop spraying, harvest and fall work. September did turn out to be harvest month and minimal crop drying was necessary.

a. Cereals and Oilseeds

Wheat acres again were close to the four consecutive years high. Yields were very satisfactory at between 30-40 bu./ac. and mainly grading No. 2 Canada Western Red Spring. Barley crops sown early suffered badly from a combination of cold and wet weather during the third week of May resulting in early infections of root rot. It is estimated that two thirds of the barley acres were affected resulting in yields of 25-35 bu./acre.

Canola crops were generally quite satisfactory throughout the Peace. Most estimates were 22 bu. average for the region which is the highest yield average ascribed to this region. Though there was some concern about green kernel content in Polish canola swathed too early, such conditions were not widespread.

Oat crops were quite favourable both in yield and quality. Yields were slightly above average at 65 bu./acre.

We were assured of excellent quality seed of all cereals and oilseeds for 1988.

b. Forage Seed Crops

Seed crops of most forages were quite variable depending on the age of the stand, and how well the crop was established. Creeping red fescue yields ranged from 100-600 lb/acre with the average down to 250 lb/acre. Drought in the fall of 1986 and in mid-summer reduced yields. Bromegrass crops too were quite variable. Some stands yielded 500 lb/acre while others scarcely made 100 lb/acre. Because of the high bromegrass prices many different fields other than regular seed fields were harvested for seed. Some seed of this origin is highly infested with a variety of other kinds of seeds posing major problems for the seed cleaners.

Timothy and crested wheat grass yields were better than average with the latter crop making a comeback after several years of no seeded acres.

Seed yields of all legume crops were only average or slightly above.

Most significant about all forage seed crops is that the current acreage of 693,000 is considerably above the "low" of 408,000 of 1978 and is approaching the "high" of 1973 which was 830,000 acres.

The forage seed industry is also progressing to a new dimension with additional forage seed cleaning plants. Two major established plants will have completely renovated their facilities by 1988 and we will see the addition of a third major plant and two minor cleaning facilities by year's end.

c. Special Crops

There has been some renewed interest in special crops but this interest is almost exclusively centred around peas.

Winter wheat acreages have also been increasing substantially over the last 4 years. The total acreage for winter wheat in 1987 was 11,000. If the crop comes through in 1988 winter wheat will continue to increase.

d. Significant Trends

1. Despite poor market opportunities, fallow acres dipped to a low of 574,000 acres.
2. Accumulated forage acreage is approaching a high at 694,000 acres.
3. Wheat acres are staying steady at the "high" which started in 1981.
4. Generous use of herbicides was apparent in all crops. Contrary to some opinions, the herbicides showing popularity are the ones recognized as reliable even if they are the expensive choices. In the group of "gaining popularity through reliability," are Poast, Glean, Ally and Lontrel.
5. The addition of a regional anhydrous manufacturing plant will add to the usage of that form of nitrogen application. Anhydrous ammonia may easily become the major source of applied nitrogen.
6. Fruits for wines are enjoying the best of times. There is now the interest and momentum in small fruits that many had hoped for when the Small Fruit Growers formed their association in 1973.
7. There is some consensus that the string is running out on financially troubled farmers going into bankruptcy. A crop of at least average proportion and some market improvement are still needed to make this certain. It is felt that many of the farms lost during the past three years were more victims of the inflation cycle rather than being incapable farmers. Hopefully we will see many of these individuals re-enter at an opportune time.

Extension Activities in the Plant Industry Sector were directed to the following areas:

1. Forage Seed Production and Marketing: Interest was quite high early in 1987 but appeared to drop in early 1988 possibly because of sufficient acreage already committed. Quite obvious was the strong need in market information rather than in production. Five production marketing seminars were held in all.

2. Crop Production: Good interest was maintained in new crop varieties, malting barley and milling oats. A total of nine meetings were conducted in these topic areas.

3. Canola Production:: The usual interest prevailed in the major seminars held this year at Grande Prairie and Peace River.

4. Weed control: The perennial weed control thrust started in 1986 was carried into 1988 with an additional 4 information meetings. Supportive to weed control programs were the Weed Inspectors Enforcement and Training Course, and assistance in perennial weed surveys.

5. Special Crops: Virtually every crop tried in this category has failed to gain popularity. Field peas however appear to be making the grade. Meetings have been held throughout the region and attendance very good.

e. Demonstrations, Field Trials

Demonstrations have improved in numbers and in quality. There is now stronger support for this means of farm technology transfer as evidenced by the success of the Smoky River Applied Research Association and a similar venture that is in the formative stages in one of the Improvement Districts.

Inventory of Research Projects

CEREALS AND OILSEEDS

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS & REPORTED	PMY	TMY
Development of new six-row feed barley varieties for Alberta	Irrigation 1 site Area 1, 1 site Area 2, 1 site Area 3, 1 site Area 4, 4 sites Area 5, 2 sites Saskatchewan, 1 site	J. Helm	Field Crops	Ongoing Annual Report Field Crops Library Agriculture library	0.2	2.0
Development of new two-row feed barley varieties for Alberta	Irrigation, 1 site Area 1, 1 site Area 2, 1 site Area 3, 1 site Area 4, 4 sites Area 5, 2 sites Saskatchewan, 1 site	J. Helm	Field Crops	Ongoing Annual Report Field Crops Library Agriculture Library	0.2	2.0
Development of high lysine and hulless barley varieties which have improved feeding value	Irrigation, 1 site Area 1, 1 site Area 2, 1 site Area 3, 1 site Area 4, 4 sites Area 5, 2 sites Saskatchewan, 1 site	J. Helm	Field Crops	Ongoing Annual Report Field Crops Library Agriculture Library	0.1	0.5
Barley germplasm creation and maintenance	Lacombe	J. Helm	Field Crops	Ongoing	0.1	0.9
The heritability of straw strength in Samson and other semi-dwarf barleys	Lacombe	J. Helm	Field Crops	Ongoing	0.1	0.1

CEREALS AND OILSEEDS (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS & REPORTED	PMY	TMY
Cereal and oilseed regional variety trials on barley, wheat, oats, flax and canola	Irrigation, 4 sites Area 1, 4 sites Area 2, 3 sites Area 3, 4 sites Area 4, 6 sites Area 5, 7 sites Area 6, 5 sites	J. Helm D. Salmon B. Wolfe K. Briggs D. McAndrew S. Kibite R. Gaudiel K. May	Field Crops Field Crops Ag. Canada U. of A. Ag. Canada Ag. Canada A.S.C.H.R.C. Ag. Canada	Ongoing, Reported Annual Report Cereal & Oilseeds Advisory Committee Report in all research libraries in Western Canada	0.1	1.2
Intensive management systems for barley and wheat F.F.F.	Lacombe	J. Helm D. Penney	Field Crops Soils Branch	Report to F.F.F.	0.1	0.7
Development of new spring triticale varieties	Irrigation, 1 site Area 2, 1 site Area 3, 2 sites Area 4, 3 sites Saskatchewan, 2 sites	D. Salmon	Field Crops	Ongoing Annual Report Field Crops and Agriculture department libraries	0.4	1.9
Germplasm development and evaluation in spring triticale	Lacombe	D. Salmon	Field Crops	Ongoing	0.1	0.2
Selection for improved seed development in triticale	Lacombe	D. Salmon J. Helm	Field Crops	Ongoing	0.1	0.1
Development of improved varieties of winter wheat and triticale	Lacombe Brooks Lethbridge Olds Trochu Saskatchewan, 3 sites	D. Salmon J. Helm	Field Crops	Ongoing Annual Report Field Crops & Agriculture department libraries	0.4	1.7
Germplasm development and evaluation in winter wheat and triticale	Lacombe	D. Salmon	Field Crops	Ongoing	0.1	0.2

CEREALS AND OILSEEDS (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS & REPORTED	PMY	TMY
Identification of lines of barley, triticale and winter wheat with improved levels of post harvest dormancy	Lacombe	D. Salmon J. Helm	Field Crops	Ongoing Published in Crop Science	0.1	0.2
Silage production of barley and triticale	Lacombe	J. Helm D. Salmon	Field Crops	Ongoing Annual Report Field Crops & Agriculture department libraries	0.1	0.2
Intensive cereal management in barley	Lacombe	J. Helm	Field Crops	Ongoing Annual Report	0.1	0.5
Screening barley germplasm for root rot resistance	Lacombe	J. Helm	Field Crops	Ongoing	0.1	0.4
Screening barley and triticale for foliar disease resistance	Lacombe Calmar Olds Trochu	J. Helm D. Salmon	Field Crops	Ongoing	0.1	0.5
Cultural practices associated with winter cereal production	Lacombe	D. Salmon J. Helm	Field Crops	Ongoing	0.1	0.5
Crop rotation in cereals	Lacombe Olds	J. Helm D. Salmon	Field Crops	Ongoing Annual Report	0.1	0.3
Yield losses due to lodging in barley	Lacombe	J. Helm D. Salmon	Field Crops	Ongoing Annual Report	0.1	0.2
Special crops agronomics for central and north central Alberta	Lacombe Camrose Morinville Vermilion	J. Helm R. Park R. Gaudiel	Field Crops F.F.F. A.S.C.H.R.C.	Project complete F.F.F.	0.1	1.5

VEGETABLES AND POTATOES

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Bulb crop cultural and cultivar project	Brooks	P. Ragan	ASCHRC	ASCHRC Annual Report 1987	0.20	0.30
Cole crop cultural and cultivar project	Brooks	P. Ragan	ASCHRC	ASCHRC Annual Report 1987 ASCHRC Pamphlet 88-4	0.20	0.25
Pea and bean cultural and cultivar project	Brooks	P. Ragan	ASCHRC	ASCHRC Annual Report 1987 ASCHRC Pamphlet 88-4	0.25	0.25
Sweet corn cultural and cultivar project	Brooks	P. Ragan	ASCHRC	ASCHRC Annual Report 1987 ASCHRC Pamphlet 88-4	0.05	0.05
Root Crop cultural and cultivar project	Brooks	P. Ragan	ASCHRC	ASCHRC Annual Report 1987 ASCHRC Pamphlet 88-4	0.02	0.05
Solanaceous vegetable cultivar and cultivar project	Brooks	P. Ragan	ASCHRC	ASCHRC Annual Report 1987 ASCHRC Pamphlet 88-4	0.02	0.20
Vegetable mulch and tunnel project	Brooks	P. Ragan	ASCHRC	ASCHRC Annual Report 1987 ASCHRC Pamphlet 88-4	0.05	0.40
Vine crop cultivar and cultural project	Brooks	P. Ragan	ASCHRC	ASCHRC Annual Report 1987 ASCHRC Pamphlet 88-4	0.15	0.40
Perennial vegetable cultivar and cultural project	Brooks	P. Ragan	ASCHRC	ASCHRC Annual Report 1987 ASCHRC Pamphlet 88-4	0.01	0.10
Handling and storage of vegetables	Brooks	J. Holley	ASCHRC	ASCHRC Annual Report 1987	0.10	0.15

VEGETABLES AND POTATO (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Processing and quality evaluation of vegetables	Brooks	N. Crowe	ASCHRC	Active	0.20	0.20
Potato cultivar improvement	Brooks Various locations	C. Schaupmeyer N. Crowe D. Lynch	ASCHRC ASCHRC Ag Canada	Active Several trials ASCHRC Annual Report 1987	0.55	0.50
Potato production research	Brooks Various locations	C. Schaupmeyer	ASCHRC	Active. Several trials ASCHRC Annual Report 1987	0.40	0.50
Processing and quality evaluation of potatoes	Brooks	N. Crowe C. Schaupmeyer	ASCHRC ASCHRC	Active ASCHRC Annual Report 1987	0.15	0.50
Screening potato cultivars to resistance to Early Blight	Brooks	J. Holley D. Lynch	ASCHRC Ag Canada	Active ASCHRC Annual Report 1987	0.05	0.05
Evaluation of fungicides for the prevention of seed-piece decay in potatoes	Brooks	R. Howard J. Holley	ASCHRC ASCHRC	Ongoing ASCHRC Annual Report 1987	0.01	0.01
FRUIT CROPS						
Bush and native fruit culture and cultivar improvement	Brooks Edmonton	L. Hausher G. Grainger	ASCHRC ATNHC	Active ASCHRC Annual Report 1987	0.20	0.60
Native fruit pilot project	Sexsmith Manning Fairview	L. Hausher J. Davidson	ASCHRC Ag Canada Beaverlodge	Active	0.18	
Small fruit culture and cultivar improvement	Brooks	L. Hausher	ASCHRC	Active ASCHRC Annual Report 1987	0.25	0.60

FRUIT CROPS (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Processing and quality evaluation of fruits	Brooks	N. Crowe L. Hausher	ASCHRC ASCHRC	Active	0.02	0.04
Native fruit utilization	Brooks	N. Crowe	ASCHRC	Active	0.15	0.10

ORNAMENTALS, TREES AND SHELTERBELTS

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Woody ornamentals	Brooks	Vacant	ASCHRC WCSH, PFRA Ag Canada, Morden Nurseries	Active. Report to WSCH ASCHRC Annual Report 1987 ASCHRC Pamphlet 88-3 Nurserymen	0.34	0.30
Annual flowers	Brooks	Vacant	ASCHRC All America Selections	Active. Report to AAS and and Seed Companies. ASCHRC Pamphlet 88-2 Annual Report 1987	0.21	0.65
Nursery production of woody ornamentals	Brooks	Vacant	ASCHRC	Active. ASCHRC Annual Report 1987. Nurserymen	0.30	0.70
Regional woody plant hardiness test	Sites	Various Alberta Vacant B. Casement G. Grainger	LANTA Growers ASCHRC ATNHC ATNHC	LANTA Active	0.15	0.25
Fairy Ring Eradication	Brooks	J. Holley R. Howard	ASCHRC ASCHRC	Active	0.01	0.02
Culture of greenhouse vegetable crops	Brooks	J. Butt	ASCHRC	Ongoing and new trials ASCHRC Annaul Report 1987	0.20	0.20

ORNAMENTALS, TREES AND SHELTERBELTS (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Culture of greenhouse floriculture and foliage crops	Brooks	J. Butt	ASCHRC ASCHRC	Ongoing and new trials Annual Report 1987	0.10	0.40
Evaluation of hydroponic systems for greenhouse crops	Brooks	J. Butt	ASCHRC	Active	0.05	0.30
GREENHOUSE CROPS						
Evaluation of rockwool as a substrate for Alberta greenhouse flower and vegetable crops	Brooks	J. Butt	ASCHRC	Active	0.20	0.30
APICULTURE/ENTOMOLOGY						
Control of insects in greenhouse crops	Redcliff Medicine Hat	A. Tellier	ASCHRC ASCHRC Annual Report 1987	Active	0.40	
Control of corn insects	Redcliff Medicine Hat	A. Tellier	ASCHRC	Active ASCHRC Annual Report 1987	0.10	
Control of cabbage insects	Brooks	A. Tellier	ASCHRC	Active ASCHRC Annual Report 1987	0.10	
Evaluation of chemical and biological agents to control greenhouse whiteflies	Redcliff Medicine Hat	A. Tellier M. Steiner	ASCHRC AEC	Active	0.15	0.10

SPECIAL CROPS

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Field bean cultivar and cultural trials	Brooks Bow Island	R. Gaudiel	ASCHRC	Active ASCHRC Annual Report 1987 Alberta Pulse Committee 1987 Expert Committee, Bean Seminars 1987	0.20	0.35
New crop cultivar, cultural, and adaptation trials	Brooks Bow Island Acadia Valley	R. Gaudiel	ASCHRC	Active ASCHRC Annual Report 1987 Special Crops Committee 1987 Pulse Crops Committee 1987 Expert Committee 1987 Growers Meetings 1987	0.40	0.60
Herbs and spices cultural and adaptability trials	Brooks	R. Gaudiel	ASCHRC	Active ASCHRC Annual Report 1987	0.10	0.05
Corn and sorghum cultivar and cultural trials	Brooks Bow Island	R. Gaudiel	ASCHRC	Active ASCHRC Annual Report 1987 Alberta Corn Committee 1987	0.20	0.10
Screening fungicides for efficacy against sclerotinia white mold on dry beans	Brooks	R. Howard	ASCHRC	Active ASCHRC Annual Report 1987 Alberta Pulse Crop Adv. Comm. ECPUA Pesticide Research Report 1987	0.05	0.05

FORAGE CROPS

Perennial forages	Brooks	H. Najda	ASCHRC	Active	0.10	0.40

FORAGE CROPS (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Diseases of forage crops	Brooks Lethbridge Southern Alberta	R. Howard H. Huang S.F. Hwang	ASCHRC Ag Canada AEC	Disease surveys and active trials ASCHRC Annual Report 1987 Plant Pathology Soc. of Alta. Scientific Journals	1.05	0.75
Intensive management of irrigated alfalfa forage	Brooks	R.C. McKenzie	ASCHRC	Active	0.04	0.12
Annual forages	Brooks	H. Najda	ASCHRC	Active	0.30	0.10

WEED CONTROL

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Weed control in pulses and special crops	Brooks Bow Island	R. Esau	ASCHRC	Active ASCHRC Annual Report 1987 Expert Committee on Weeds	0.25	0.25
Chemical weed control for nursery crops and shelterbelts	Brooks	R. Esau	ASCHRC	Active ASCHRC Annual Report 1987 Expert Committee on Weeds Canadian Horticultural Council	0.20	0.15
Chemical weed control in small and native fruit	Brooks	R. Esau	ASCHRC	Active ASCHRC Annual Report 1987	0.02	0.02
Weed control in vegetable crops	Brooks	R. Esau	ASCHRC	Active ASCHRC Annual Report 1987 Expert Committee on Weeds Canadian Horticultural Council	0.25	0.28

WEED CONTROL (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Weed control in potatoes	Brooks	R. Esau	ASCHRC	Active ASCHRC Annual Report 1987 Expert Committee on Weeds	0.20	0.23
Herbicide residues in crop rotation	Brooks	R. Esau	ASCHRC	ASCHRC Annual Report 1987 Expert Committee on Weeds	0.08	0.07
Application of herbicides through irrigation systems	Brooks	R. Esau	ASCHRC	Active Expert Committee on Weeds	0.03	0.07
WEED RESEARCH & DEVELOPMENT						
Round-leaved mallow control - in wheat	Acme	D. Maurice/ D. Cole	Crop Protection Branch	Expert Committee on Weeds - Research Report 1987 1987 Research Results - Crop Protection Branch	.007	0.02
Scentless chamomile control - in cereals	St. Francis Leduc Bezanson	D. Maurice/ D. Cole	Crop Protection Branch	ECW Research Report 1987 1987 Research Results - Crop Protection Branch	0.005 0.005 0.005	0.02 0.02 0.02
Milkweed Control	Duchess	D. Maurice/ D. Cole	Crop Protection Branch	On-going project ECW Research Results 1987 Research Results - Crop Protection Branch	0.005	0.008
Ox-eye Daisy Control - in established mixed forage - in established pasture	Buck Lake Edson	D. Maurice/ D. Cole	Crop Protection Branch	On-going project ECW Research Report 1987 1987 Research Results - Crop Protection Branch	0.005 0.005	0.02 0.02

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Pasture Sage Control		D. Maurice/	Crop Protection	On-going project		
- in native pasture	Irricana	D. Cole	Branch	ECW Research Report 1987	0.005	0.02
				1987 Research Results -		
	Three Hills			Crop Protection Branch	0.005	0.02
Tansy Control		D. Maurice/	Crop Protection	Stony Plain and Athabasca	0.002	0.01
- in non-cropland	Stony Plain	D. Cole	Branch	sites - on-going projects		
- in a grass hayfield	Athabasca			ECW Research Report 1987	0.002	0.01
- on roadside	Smoky Lake			1987 Research Results -		
				Crop Protection Branch	0.002	0.01
Tall Buttercup Control		D. Maurice/	Crop Protection	ECW Research Report 1987		
- in pasture	Winfield	D. Cole	Branch	1987 Research Results	0.002	0.08
				Crop Protection Branch		
Scentless Chamomile Control		D. Cole/	Crop Protection	Calmar site - on-going		
- in established alfalfa	Calmar	D. Maurice	Branch	ECW Research Report 1987	0.002	0.02
	Leduc			1987 Research Results -		
				Crop Protection Branch	0.002	0.01
Toadflax Control		D. Cole/	Crop Protection	On-going project		
- in established alfalfa	Stettler	D. Maurice	Branch	ECW Research Report 1987		
				1987 Research Results -	0.005	0.01
				Crop Protection Branch		
White Cockle Control		D. Cole/	Crop Protection	On-going project		
- in a mixed forage stand	Alhambra	D. Maurice	Branch	ECW Research Report 1987		
				1987 Research Results -	0.005	0.02
				Crop Protection Branch		
Seedling grass tolerance		D. Cole/	Crop Protection	On-going project		
- to herbicides	Edmonton	D. Maurice	Branch	ECW Research Report 1987		
		L. Darwent	Agriculture Can.	1987 Research Results -	0.01	0.03
			Beaverlodge	Crop Protection Branch		

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Seedling legume tolerance - to herbicides	Edmonton	D. Cole/ D. Maurice L. Darwent	Crop Protection Branch Agriculture Can. Beaverlodge	On-going project ECW Research Report 1987 1987 Research Results - Crop Protection Branch	0.01	0.03
Legume tolerance - to soil incorporated herbicides	Edmonton	D. Cole/ D. Maurice L. Darwent	Crop Protection Agriculture Can. Beaverlodge	On-going project ECW Research Report 1987 1987 Research Results - Crop Protection Branch	0.01	0.03
Established grass tolerance - to herbicides	Namao	D. Cole/ D. Maurice L. Darwent	Crop Protection Branch Agriculture Can. Beaverlodge	ECW Research Report 1987 1987 Research Results - Crop Protection Branch	0.005	0.02
Established legume tolerance - to herbicides	Namao	D. Cole/ D. Maurice L. Darwent	Crop Protection Branch Agriculture Can. Beaverlodge	ECW Research Report 1987 1987 Research Results - Crop Protection Branch	0.005	0.02
Inactivation of soil residual herbicides	Tofield Namao	D. Maurice/ Industrial Vegetation Management Asso. of Alberta	Crop Protection Branch IVMAA	Tofield site - on-going IVMAA Field Manual	0.005 0.005	0.01 0.03

GREENHOUSE CROPS

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Greenhouse vegetable production in different substrates	Edmonton	M. Mohyuddin	ATN & HC	Ongoing	0.025	0.25
Tomato varietal trials	Edmonton	M. Mohyuddin	ATN & HC	Completed, 0.025 greenhouse growers	0.20	

GREENHOUSE CROPS (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Gerberas pot size trials	Edmonton	M. Mohyuddin	ATN & HC	Completed, growers	0.01	0.2
Micropropogation of saskatoons, cherries and lilac	Edmonton	M. Mohyuddin K. Pruski	ATN & HC	Ongoing	0.1	1.2
Propogation of geraniums and chrysanthemums by tissue culture	Edmonton	M. Mohyuddin	ATN & HC	Ongoing	0.05	0.2
Production of oyster mushrooms in the greenhouse	Edmonton	M. Mohyuddin S. Davies	ATN & HC AEC Vegreville	Ongoing	0.05	0.02

ORNAMENTALS, TREES AND SHELTERBELTS

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Regional woody plant hardiness test program	Various Alberta Sites	LANTA Growers B. Casement G. Grainger	LANTA ATN & HC ATN & HC	Active - Nurserymen and co-operators	0.15	0.25
Woody ornamental fertilizer trials	Edmonton	G. Grainger B. Casement	ATN & HC ATN & HC	Active	0.10	0.25
Pruning wound trial	Edmonton	B. Casement	ATN & HC	Active	0.01	0.01
Adaption and hardiness trial of selection of salicaceae	Edmonton	B. Casement	ATN & HC	Active	0.01	0.02

SOIL FERTILITY AND PROBLEM SOIL MANAGEMENT

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Fertilizer requirements of irrigated grains and oilseeds	2 major locations 3 locations on-farm	R.H. McKenzie J. Carefoot	Soils Branch Agric. Canada FFF funded	Field Research Complete Final report Pending	0.30	1.50

SOIL FERTILITY AND PROBLEM SOIL MANAGEMENT (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Fertilizer requirements of dryland crops	6 major locations	R.H. McKenzie	Soils Branch	Ongoing	0.20	0.40
Fertilizer requirements irrigated special crops	2 major locations	R.H. McKenzie R. Gaudiel	Soils Branch ASCHRC	Field Research Complete Final Report Complete	0.20	0.20
Comparison of soil testing laboratories	2 locations	R.H. McKenzie	Soils Branch	Field Research Complete Final Report Complete	0.05	0.50
Intensive Crop Management systems for wheat and barley under irrigated and dryland conditions	4 locations	R.H. McKenzie D. Penney E. Solberg J. Helm	Soils Branch Soils Branch Soils Branch Field Crops Br.	Ongoing, Reported at FFF annual conference and Research Report to FFF	1.0	3.00
Soil Phosphorus Cycling and development of a laboratory test for Soil Phosphorus	Laboratory Project	R.H. McKenzie J.F. Dormaar J.W.B. Stewert	Soils Branch Agric. Canada Univ. of Sask.	Ongoing	0.20	1.50
Fertilizer and other input requirements for maximum economic yield	3 locations	E. Solberg D. Penney	Soils Branch	Ongoing	0.40	1.00
Effect of chloride on yield and diseases of barley	4 locations	D. Penney J.A. Robertson E. Solberg	Soils Branch Univ. of Alberta Soils Branch	Ongoing	0.15	0.8
The extent and location of Cu deficient soils	1 field experiment 25 sampling sites	D. Penney E. Solberg L. Kryzanowski	Soils Branch Soils Branch Soils & Animal Nutrition Lab.	Ongoing. Paper presented at Great Plains Soil Fertility Workshop, Denver and Alberta Soil Science Workshop	0.25	0.2

ICAR SYSTEM SYSTEME IRAC

ESTAB/ETAN:. 20923

ICAR ID	PROJECT TITLE
61004254	Potato Cultivar Improvement
61004255	Potato Production Research
61004263	Bulb Crop Cultural And Cultivar Trials
61004265	Sweet Corn Cultivar Trials
61004266	Pea and Bean Cultural and Cultivar Trials
61004267	Cole Crop Cultural and Cultivar Trials
61004316	Weed Control in Pulses and Special Crops
61004319	Weed Control in Vegetable Crops
61004320	Weed Control in Nursery Crops and Shelterbelts
61004321	Weed Control in Potatoes
61006667	Herbicide Residues on Crop Rotation
61006694	Studies on Diseases of Greenhouse Crops
61006752	Sprinkler Irrigation on Management of Seed Alfalfa
61006782	Diseases of Forage Crops
61006784	Screening Potato Cultivars for Resistance to Early Blight
61006792	Field Bean Cultivar and Cultural Trials
61006793	New Crops Cultivar Cultural and Adaptation Trials
61006794	Herbs and Spices Cultural and Adaptability Trials
61006795	Corn and Sorghum Cultivar and Cultural Trials
61006800	Vine Crop Cultivar and Cultural Trials
61006807	Native Fruit Crops Pilot Project
61009474	Chemical Weed Control in Small and Native Fruit
61009475	Bush and Native Fruit Culture and Cultivar Improvement
61009476	Nursery Production of Woody Ornamentals
61009477	Annual and Perennial Flowers
61009478	Woody Ornamentals
61009485	Processing and Quality Evaluation of Potatoes
61009487	Processing and Quality Evaluation of Vegetables
61009488	Processing and Quality Evaluation of Fruit
61009489	Native Fruit Utilization
61009491	Culture of Greenhouse Vegetable Crops
61009492	Evaluation of Hydroponic Systems for Growing Greenhouse Crops
61009493	Solanceous Vegetable Cultural and Cultivar Trials
61009494	Vegetable Mulch and Tunnel Trials
61009495	Perennial Vegetable Culture and Cultivar Trials
61009496	Culture of Greenhouse Floriculture Crops
61009497	Root Crop Cultivar and Cultural Trials
84100553	Screening Fungicides for Efficacy against Sclerotinia White Mold on Dry Peas and Beans
84100555	Regional Woody Plant Hardiness Test Program

84100557	Evaluation of Chemical and Biological Agents to Control Greenhouse Pests
84100558	Small Fruit Culture and Cultivar Improvement
84100559	Perennial Forages
84100560	Cereal and Oilseed Regional Variety Trials
86100786	Application of Herbicides through Irrigation Systems
86100790	Fairy Ring Eradication
87000212	Water Management of Lentils
87000213	Water Management of Safflower

Publications

A. PUBLICATIONS/BULLETINS

1. NEW

- Recommended Methods of Soil Analyses for Canadian Prairie Agricultural Soils. Alberta Agriculture Soils Branch.

- References for Methods used in the Analysis of Soils and Plant and Feed Materials at the Alberta Agricultural Soils and Animal Nutrition Laboratory. Soils Branch.

- Influence of Fertilizer N Management and Region on Nitrate Leaching Potential in Several Alberta Soils. Heaney, D.J., E.D. Solberg, J. Harapiak, M. Nyborg and S.S. Mahli.

- Registration of Noble Barley. J.H. Helm, D. F. Salmon, D.H. Dyson and W.M. Stewart, Crop Science (in press).

- Registration of Wapiti Triticale. D.F. Salmon, J.H. Helm, T.R. Duggan, D.H. Dyson, D. Westling, Crop Science (in press).

- Annual Report Cereal and Oilseed Variety Testing Program; 1987 season. Field Crops Branch.

- Annual Report Crop Research; Barley Breeding, Triticale Breeding, Winter Wheat Breeding and Agronomic Research, 1987 season. Field Crops Branch.

- Fall Rye Production in Alberta - Field Crops Branch.

- Range Pastures in Alberta - Field Crops Branch.

- Alberta Weed & Pest Control Inspections Guide - Crop Protection Branch.

- Weed Fliers - Scentless Chamomile, Leafy Spurge, Toadflax, Knapweed - Crop Protection Branch.

- 1987 Research Results - Crop Protection Branch.

2. Revised/Updated

- Guide to Crop Protection in Alberta Part I - Chemical - Crop Protection Branch.

- Judging Standards for Horticulture Shows - Alberta Tree Nursery & Horticulture Centre.

- Landscaping Alberta Yards - Alberta Tree Nursery & Horticulture Centre.

PUBLICATIONS/BULLETINS (continued)

- Poinsettia Production - Alberta Tree Nursery & Horticulture Centre.
- Bedding Plant Production - Alberta Tree Nursery & Horticulture Centre.

B. FACT SHEETS

100/32	"Varieties of Cereal and Oilseeds of Alberta" - Field Crops Branch
120/32	"Varieties of Perennial Hay and Pasture Crops for Alberta" - Field Crops Branch
134/6	"Alberta Range Plants" - Field Crops Branch
140/32-1	"Varieties of Special Crops for Alberta" - Field Crops Branch
142/20-6	"Dry Pea Production in Alberta" - Field Crops Branch
142/20-5	"Lentil Production in Alberta" - Field Crops Branch
120/640-1	"Weed Control in Forage Crops" - Crop Protection Branch
641-13	"Control of Green Foxtail" - Crop Protection Branch
612-5	"How to Reduce Bee Poisoning from Pesticides" - Crop Protection Branch
149/632-4	"Disease Forecasting for Sclerotinia White Stem Rot in canola" - Crop Protection Branch
100/632	"Seed Treatment of Cereals, Oilseeds and Pulse Crops" (revised) - Crop Protection Branch
149/632-3	"Blackleg of Canola" (revised) - Crop Protection Branch
112/632-2	"Effects of Copper on Stem Melanosis of Park and Other Wheat cultivars" - Crop Protection Branch
518-12	"Management of Organic Soilsz." Soils Branch
533	"How to Get the Most from your Soil Test Report." Soils Branch
	"Potassium Fertilization of Barley and Rapeseed (Canadex)." Malhi, S.S., A.C. Dick, D.R. Walker, L. Kryzanowski.
	"Phosphorus Fertilization of Barley and Rapeseed (Canadex)." Malhi, S.S., A.C. Dick, D.R. Walker, L. Kryzanowski.

ASCHRC PAMPHLET SERIES NOS.

87-16	Report of the Food Processing and Quality Evaluation Program.
87-13	Regional Crop Laboratory Report, 1987.

ASCHRC PAMPHLET

SERIES NOS. (continued)

87-10 Weed Control Trials 1986.

88-6 Fruit Crop Trials.

87-7 Sources of Fruit Cultivars (revised).

87-18 Plant Pathology Program Report, 1986.

87-15 Post-Harvest Program Report, 1986.

88-4 Vegetable Cultural Trials, 1987.

88-5 Vegetable Cultivar Trials, 1987.

C. TECHNICAL MEMO

Pesticide Pigments - Crop Protection Branch
Fusilade Registration - Crop Protection Branch
Glyphosate Registration for Domestic Use - Crop Protection Branch
Label Changes for Cerone - Crop Protection Branch
Russian Wheat Aphid - Crop Protection Branch
2,4-D and MCPA on Legume - Crop Protection Branch
Ally Registration - Crop Protection Branch

D. SCIENTIFIC PAPERS

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F. ABSTRACTS

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Western Section (1987) Abstracts by D. Maurice and D. Cole

- Effect of time of application of the control of tall buttercup with MCPA amine
- Control of tansy in a grass hay field with chlorsulfuron and metsulfuron methyl
- Control of tansy on roadsides

ABSTRACTS (continued)

- Ox-eye daisy control in established pastures
- Ox-eye daisy control in an established mixed forage stand
- Control of milkweed
- Scentless chamomile control in established alfalfa (2)
- Toadflax control in established alfalfa and brome grass
- White cockle control is a mixed forage stand

OTHER

Tolerance of seedling legumes to herbicides
Tolerance of seedling grasses to herbicides
Tolerance of established legumes to herbicides (2)
Tolerance of legumes to soil incorporated herbicides
Tolerance of established grasses to herbicides (2)
Control of Scentless chamomile, Hemp-nettle and Horsetail in wheat
Control of Scentless chamomile in barley (2)
Round-leaved mallow control in wheat
Control of pasture sage in native pastures

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- Weed Control in Nursery Container Stock. R. Esau
- Efficacy of Herbicides for Squash. R. Esau
- Day-Neutral strawberry cultivar trials. L. Hausher
- Strawberry cultivar trials. L. Hausher
- Efficacy of fungicides against powdery mildew of oak-leaf ivy. R. Howard, E. Moskaluk, and T. Allen
- Removal of visible fungicide residues from the foliage of grape and oak-leaf ivies. R. Howard, E. Moskaluk, and T. Allen
- Efficacy and phytotoxicity of insecticides on saskatoon. R. Howard, E. Moskaluk, and J. Davidson
- Screening of processing pea cultivars for resistance to root rot. R. Howard and E. Moskaluk
- Processing quality of small white beans. M. S. Kaldy, R. G. Gaudiel, and S. J. Park
- Saskatoon Fruit Leather. T. Smyrl and M. Dench
- Dutch Elm Disease and Elm Bark Beetle Survey, 1987. A. Tellier

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- Dicamba Plant Back Study - Wheat
- Nightshade Control in Dry Beans
- Dicamba Plant Back Study - Lentil
- Grassy Weed Control in Processing Peas
- Weed Control in Processing Peas
- Weed Control in Cabbage
- Graminicides For Use in Cucumbers
- Efficacy of Three Herbicides for Squash With or Without Plastic Mulch
- Postemergence Treatments for Weed Control in Onions

Abstracts by Rudy Esau (continued)

- Tolerance of Onions to Bromoxynil
- Grassy Weed Control in Potatoes
- Weed Control for Spiraea Container Stock
- Weed Control for Juniper Container Stock
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- Efficacy and phytotoxicity of fungicides on saskatoons, 1987. R. J. Howard, E. R. Moskaluk, and J. G. N. Davidson
- Evalutation of the phytotoxicity of soil-applied fungicides on *Cissus rhombifolia*, 1987. R. J. Howard, E. R. Moskaluk, and T. Allen
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- Efficacy of fungicides against powdery mildew of *Cissus rhombifolia*, 1987. R. J. Howard, E. R. Moskaluk, and T. Allen
- An evaluation of two fungicides and two application methods for the control of white mold on dry peas, 1987. R J. Howard and E. R. Moskaluk
- Seed treatment evaluation for loose smut control in Galt barley, 1987. D. D. Orr, S. Slopek, J. G. N. Davidson and P. D. Kharbanda
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